United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Livingston County, Illinois

How To Use This Soil Survey

General Soil Map

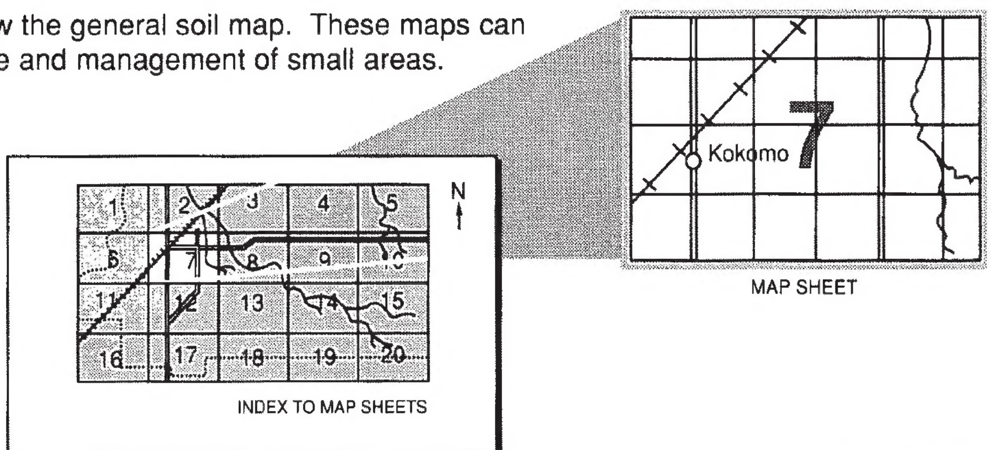
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

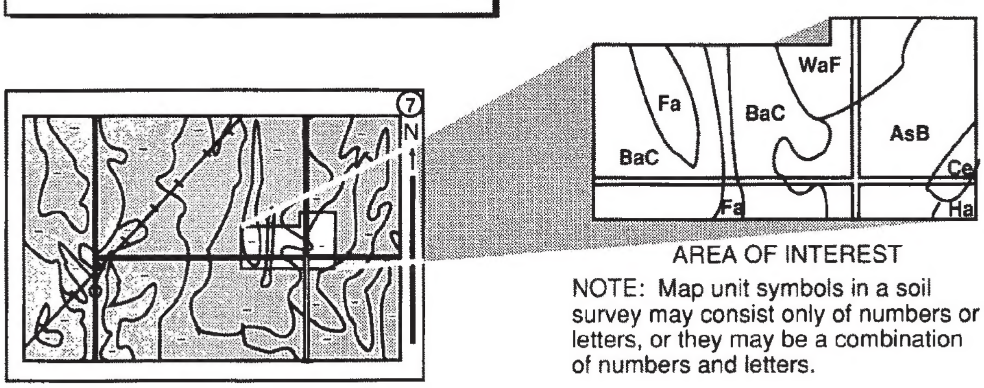
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1989. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1989. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Livingston County Soil and Water Conservation District. The Livingston County Board and the Illinois Department of Agriculture provided financial assistance.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 156.

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Cover: A scenic area along the Vermilion River near Streator.

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Issued April 1996

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Livingston County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil.is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Thomas W. Christenson
State Conservationist
Natural Resources Conservation Service

Soil Survey of Livingston County, Illinois

By Stephen K. Higgins, Natural Resources Conservation Service

Soils surveyed by Mark G. Carlson, Stephen K. Higgins, and Laura L. Merkel, Natural Resources Conservation Service, and Paul E. Brown and Mark L. Kohrt, Livingston County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Illinois Agricultural Experiment Station

LIVINGSTON COUNTY is in the east-central part of Illinois (fig. 1). It has an area of 669,620 acres, or about 1,046 square miles. It is bordered on the south by McLean and Ford Counties, on the east by Ford and Kankakee Counties, on the north by Grundy and La Salle Counties, and on the west by La Salle and Woodford Counties. In 1980, the population of the county was 41,381. Pontiac, the county seat and largest city, had a population of 11,227.

This survey updates the soil survey of Livingston County published by the University of Illinois in 1949. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section provides general information about Livingston County. It describes climate; history and development; transportation facilities; natural resources; and relief, physiography, and drainage.

Climate

Wayne Wendland and Wayne Armstrong, Illinois State Water Survey, helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Pontiac in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 26.8 degrees F and the average daily minimum temperature is 18.9 degrees. The lowest temperature on record, which occurred at Pontiac on January 23, 1909, is -24 degrees. In summer, the average temperature is 73.4 degrees and the average daily maximum temperature is 84.2 degrees. The highest recorded temperature, which occurred at Pontiac on July 14, 1936, is 108 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 33.85 inches. Of this, 22.39 inches, or 66 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17.84 inches. The heaviest 1-day rainfall during the period of record was 5.67 inches.

The average seasonal snowfall is 24.5 inches. The greatest snow depth at any one time during the period of record was 19 inches. On the average, 41 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 65 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines

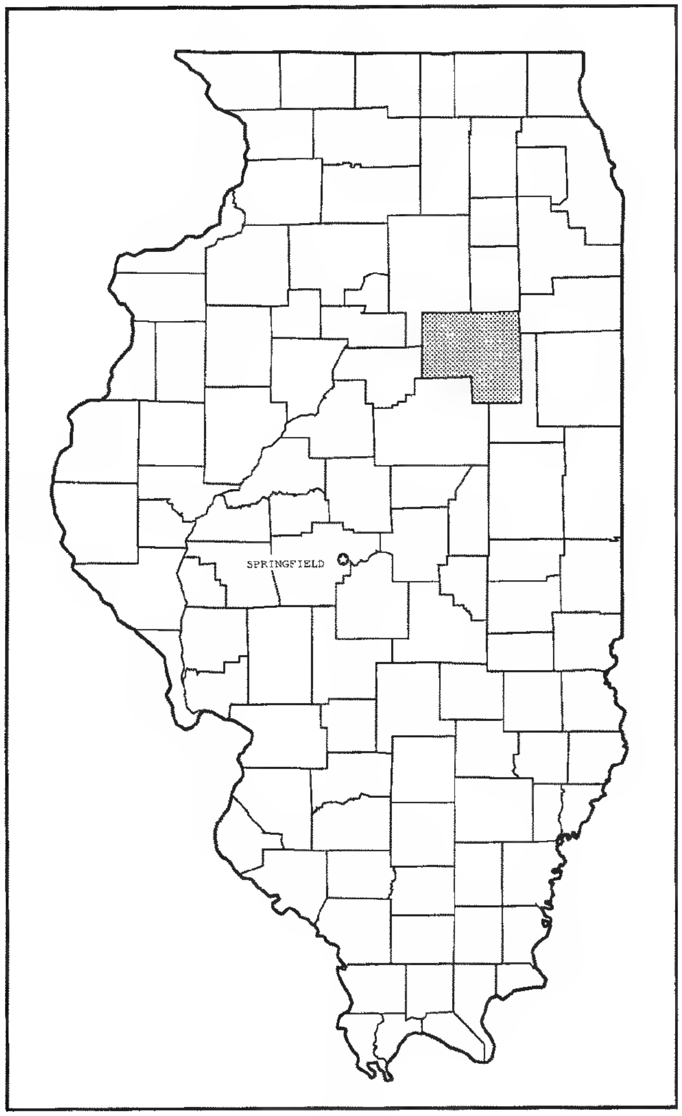

Figure 1.—Location of Livingston County in Illinois.

69 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12.3 miles per hour, in March.

History and Development

W. Darnall and Frederick Rook were the first European settlers in the survey area. When they arrived in 1829, the area was inhabited by the Pottawatomie and Kickapoo Indians. The early settlers chose to live near the forested areas, where the supply of firewood was plentiful. Also, they feared prairie fires and extreme winds and believed that the prairies were infertile.

Livingston County was formed in 1837 from parts of McLean and La Salle Counties. The county was named for Edward Livingston, who was Secretary of State under Andrew Jackson. It was the 66th county to be established in Illinois.

The late 1800's were a period of major growth in the county *(4)*. Drainage practices were being utilized to turn swampland into cropland, and agriculture had become the primary industry. The opening of several railroads through the county also boosted development, and coal mining was an important industry.

In the 1900's, growth continued in the county, especially in agricultural production. The Livingston County Soil and Water Conservation District was formed in 1945.

Presently, agriculture is Livingston County's primary industry. Approximately 93 percent of the county is cropland *(9)*. Corn and soybeans are the major crops. The principal manufactured products are fuel injectors, printed materials, industrial shelving, furniture, food products, concrete bridge trusses, pipe, metal products, gloves, shoe soles, and glass products. There are also several limestone and gravel quarries in the county.

Transportation Facilities

The transportation facilities in Livingston County include interstate highways, railroads, bus service, and airports. Interstate 55 dissects the county and provides access to the north and south. State Highways 17, 18, 23, 47, 116, and 170 also cross the county. Several county roads provide important transportation links. Most of the secondary county and township roads are blacktop. Bus service provides transportation along Interstate 55. Railroads provide passenger and freight service through the county. A small airport is at Pontiac, and several smaller landing strips are throughout the county. Daily shuttle bus service provides a link to O'Hare International Airport in Chicago, Illinois, and to Bloomington Airport in Bloomington, Illinois.

Natural Resources

Soil is the chief natural resource in Livingston County. About 619,946 acres in the county is used as cropland, and about 12,419 acres is used for pasture *(9)*. The main crops are corn, soybeans, and wheat. Other farm products include hay, popcorn, fruits and vegetables, cattle, hogs, dairy products, and poultry.

Woodland makes up about 6,688 acres in the county *(9)*. It is in scattered areas throughout the county, but large tracts are along drainageways and along the Vermilion River. These wooded areas are a source of wood products and provide habitat for wildlife.

The county has many small ponds and several hundred miles of rivers and streams. These water areas provide opportunities for recreation, including fishing and boating.

Subsurface natural resources include water, limestone, gravel, and sand. Adequate water supplies are available in most parts of the county for farm and domestic use. Several limestone quarries and gravel pits are in the county. The limestone and gravel are used in agriculture and in construction.

Relief, Physiography, and Drainage

The landscape in Livingston County was greatly influenced by the glaciers that reached into the area. The survey area has been covered by several glaciers throughout history, but the most recent glacier, the Wisconsinan, has had the greatest influence on the present topography. The ice front advanced and retreated several times during the Wisconsinan Age, leaving a complex system of glacial moraines that are still evident today. Material of various thicknesses and textures was deposited by the glaciers. These deposits are called glacial till. Subsequent combinations of layers of windblown loess, glacial outwash, lacustrine sediments, and gravel were then deposited over the glacial till in the uplands. During the Wisconsinan Glaciation, excessive drainage was discharged into the Kankakee Valley, resulting in the Kankakee Flood. The drainage patterns that existed at that time were inadequate to accommodate such a flood, and at the peak of flow the water spread widely over the uplands and formed Lakes Watseka, Wauponsee, Pontiac, and Ottawa. The lakes were lowered as they drained into the Illinois River *(10)*.

Relief in the county is generally low. Most areas are nearly level or gently sloping, but a few more sloping areas are in the north-central part of the county. The areas with the most relief are along the Vermilion River in the northern half of the county and in a small area east of Strawn in the southeastern part of the county.

Livingston County is drained primarily by the Vermilion River and its tributaries. The northeastern part of the county is drained by the Mazon River and its tributaries. A small area in the southwestern part of the county drains into the Mackinaw River to the south. The western one-third of the county drains to the northeast into the Vermilion River, which flows to the Illinois River. The central part of the county drains to the west into the Vermilion River. The southeastern part of the county drains northwest to the Vermilion River. The northeastern part of the county drains north to the Mazon River, which flows to the Illinois River.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists

classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Some of the soil names on the soil maps of Livingston County do not agree with those on the soil maps of McLean, Ford, Kankakee, Grundy, La Salle, and Woodford Counties. The differences are mainly the result of variations in the extent of the soils in the survey areas. They do not significantly affect the use of the maps for general planning purposes.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

Nearly Level to Sloping Soils That Are Slowly Permeable in the Upper Part and Very Slowly Permeable in the Lower Part, Are Very Slowly Permeable, or Are Moderately Slowly Permeable in the Upper Part and Slowly Permeable in the Lower Part; on Till Plains

The major management needs in areas of these soils are a surface drainage system, an adequate moisture supply, and erosion control.

1. Bryce-Swygert Association

Nearly level and gently sloping, poorly drained and somewhat poorly drained, clayey soils that formed in lacustrine sediments and in the underlying glacial till

This association consists of Bryce soils in broad, nearly level, low areas and Swygert soils on slight rises, ridges, and side slopes (fig. 2). The difference in elevation between the high and low areas ranges from about 5 to 40 feet.

This association makes up about 23 percent of the county. It is about 48 percent Bryce soils, 38 percent Swygert soils, and 14 percent soils of minor extent.

Bryce soils are poorly drained. Typically, the surface soil is black, firm silty clay about 11 inches thick. The subsoil is about 37 inches thick. The upper part is dark grayish brown and grayish brown, mottled, firm silty clay. The next part is olive gray, mottled, firm silty clay. The lower part is olive gray, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is dark gray, mottled, firm, calcareous silty clay.

Swygert soils are somewhat poorly drained. Typically, the surface layer is black and very dark gray, friable silty clay loam about 14 inches thick. The subsoil is light olive brown, mottled, firm silty clay about 27 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches or more is light olive brown, mottled, very firm, calcareous silty clay.

Of minor extent in this association are Clarence, Mokena, Mona, and Rantoul soils. The somewhat poorly drained Clarence soils are in landscape positions similar to those of the Swygert soils. They have more clay in the subsoil than the Swygert soils. The somewhat poorly drained Mokena soils are higher on the landscape than the Bryce soils. The moderately well drained Mona soils are on the steeper side slopes. They have more sand in the subsoil than the Swygert soils. The very poorly drained Rantoul soils are in depressions.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The major management concerns are a seasonal high water table, ponding, restricted permeability, a moderate available water capacity, and the hazard of water erosion. Subsurface drains do not function well because of the restricted permeability. A surface drainage system generally is needed.

The major soils are poorly suited to use as sites for dwellings or for septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, the restricted permeability, and a high shrink-swell potential.

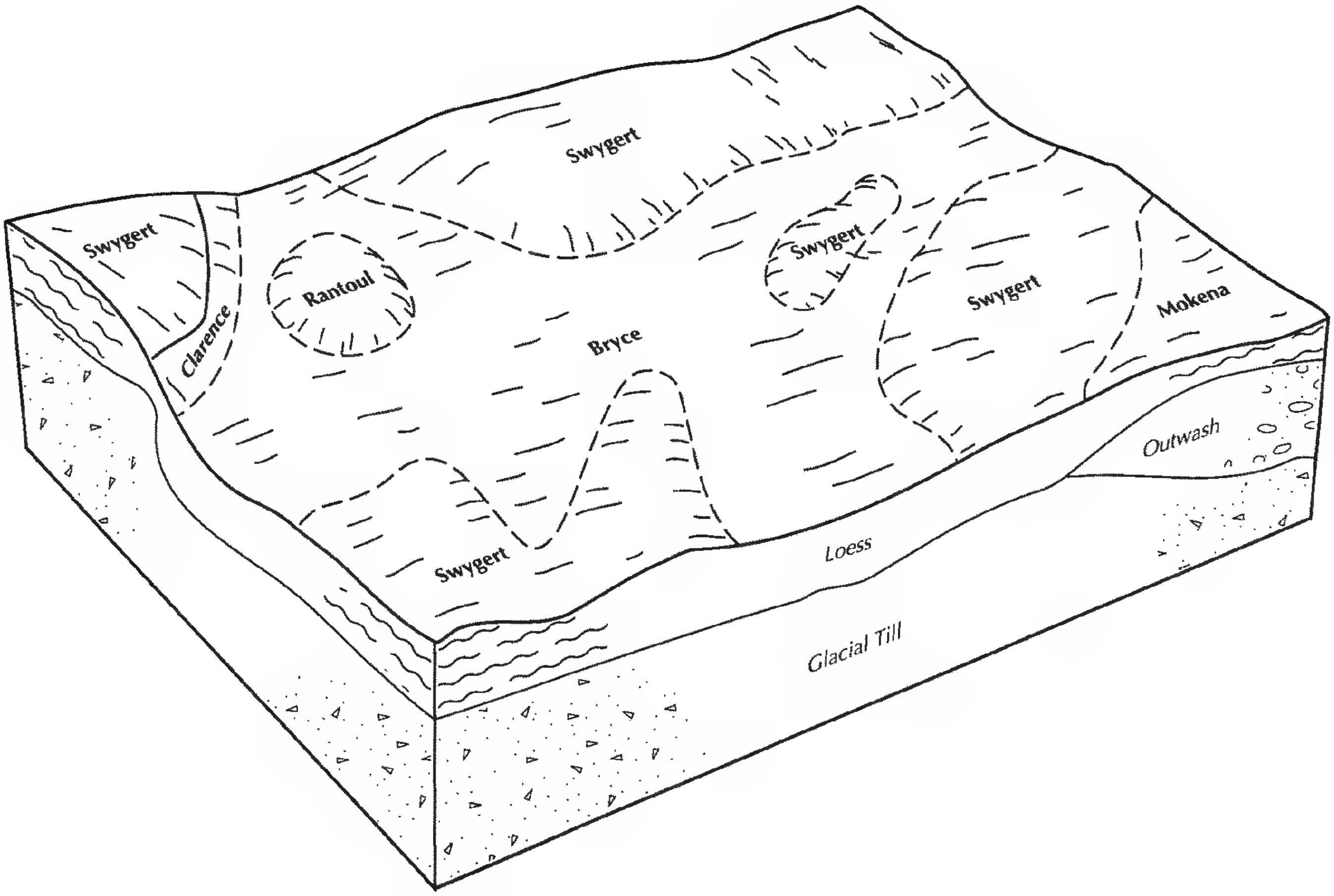

Figure 2.—Typical pattern of soils and parent material in the Bryce-Swygert association.

2. Clarence-Rowe Association

Nearly level to sloping, somewhat poorly drained and poorly drained, silty and clayey soils that formed in a thin layer of loess or lacustrine sediments and in the underlying glacial till

This association consists of Clarence soils on slight rises, ridges, and side slopes and Rowe soils on broad flats and in low areas (fig. 3). The difference in elevation between the high and low areas ranges from about 5 to 40 feet.

This association makes up about 8 percent of the county. It is about 54 percent Clarence soils, 28 percent Rowe soils, and 18 percent soils of minor extent.

Clarence soils are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silty clay loam about 13 inches thick. The subsoil is about 15 inches thick. The upper part is dark grayish brown, mottled, very firm silty clay. The next part is grayish brown, mottled, very firm clay. The lower part is grayish brown, mottled, very firm, calcareous clay. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous clay.

Rowe soils are poorly drained. Typically, the surface layer is black, friable silty clay about 11 inches thick. The subsoil is about 34 inches thick. The upper part is dark grayish brown, mottled, friable silty clay. The next part is gray, mottled, firm silty clay. The lower part is gray, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay.

Of minor extent in this association are Chatsworth, Mona, and Swygert soils. The moderately well drained Chatsworth and Mona soils are on the steeper side slopes. Chatsworth soils have a thinner subsoil than the Clarence soils. Mona soils have more sand in the subsoil than Clarence soils. The somewhat poorly drained Swygert soils are in landscape positions similar to those of the Clarence soils. They have less clay in the subsoil than the Clarence soils.

Most areas of this association are used for cultivated crops. The soils are suited to the cultivated crops

commonly grown in the county. The major management concerns are a seasonal high water table, ponding, restricted permeability, a moderate available water capacity, and a high clay content.

The major soils are poorly suited to use as sites for dwellings or for septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, and the restricted permeability.

3. Rutland-Streator Association

Nearly level and gently sloping, somewhat poorly drained and poorly drained, silty and clayey soils that formed in a thick layer of loess and in the underlying glacial till

This association consists of Rutland soils on slight rises, ridges, and side slopes and Streator soils in broad, nearly level, low areas. The difference in elevation between the high and low areas ranges from about 5 to 40 feet.

This association makes up about 0.3 percent of the county. It is about 50 percent Rutland soils, 32 percent Streator soils, and 18 percent soils of minor extent.

Rutland soils are somewhat poorly drained. Typically, the surface soil is black, friable silty clay loam about 15 inches thick. The subsoil is about 31 inches thick. In sequence downward, it is brown, mottled, friable silty clay; dark brown, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and light olive brown and gray, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light olive brown and gray, firm, calcareous silty clay.

Streator soils are poorly drained. Typically, the surface layer is black and very dark gray silty clay loam about 16 inches thick. The subsoil is about 35 inches thick. The upper part is dark gray and olive gray, mottled, firm and very firm silty clay loam. The lower part is olive gray, mottled, very firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is gray, mottled, very firm, calcareous silty clay.

Of minor extent in this association are Rantoul and Swygert soils. The very poorly drained Rantoul soils are in depressions below the major soils. The somewhat poorly drained Swygert soils are in landscape positions similar to those of the Rutland soils. They have a

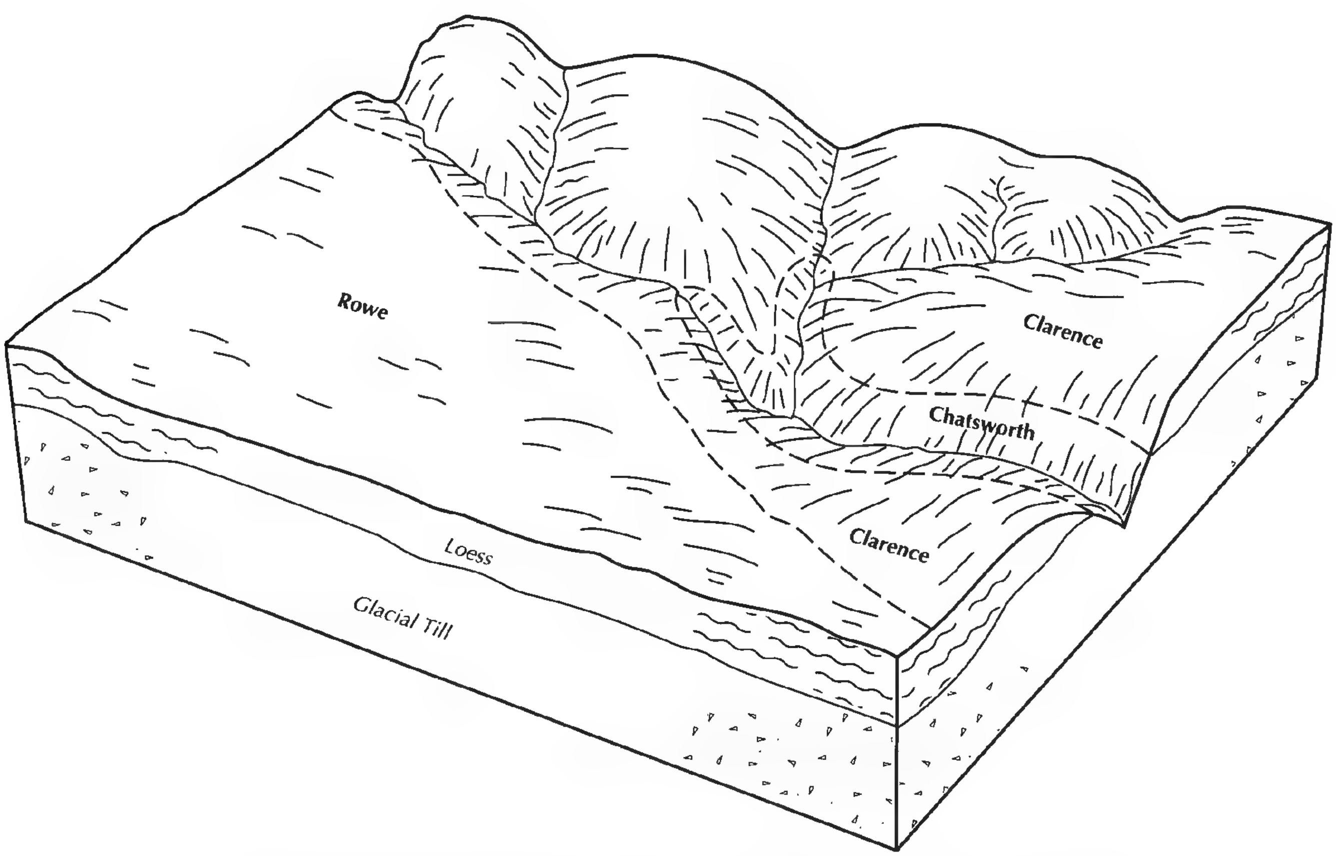

Figure 3.—Typical pattern of soils and parent material in the Clarence-Rowe association.

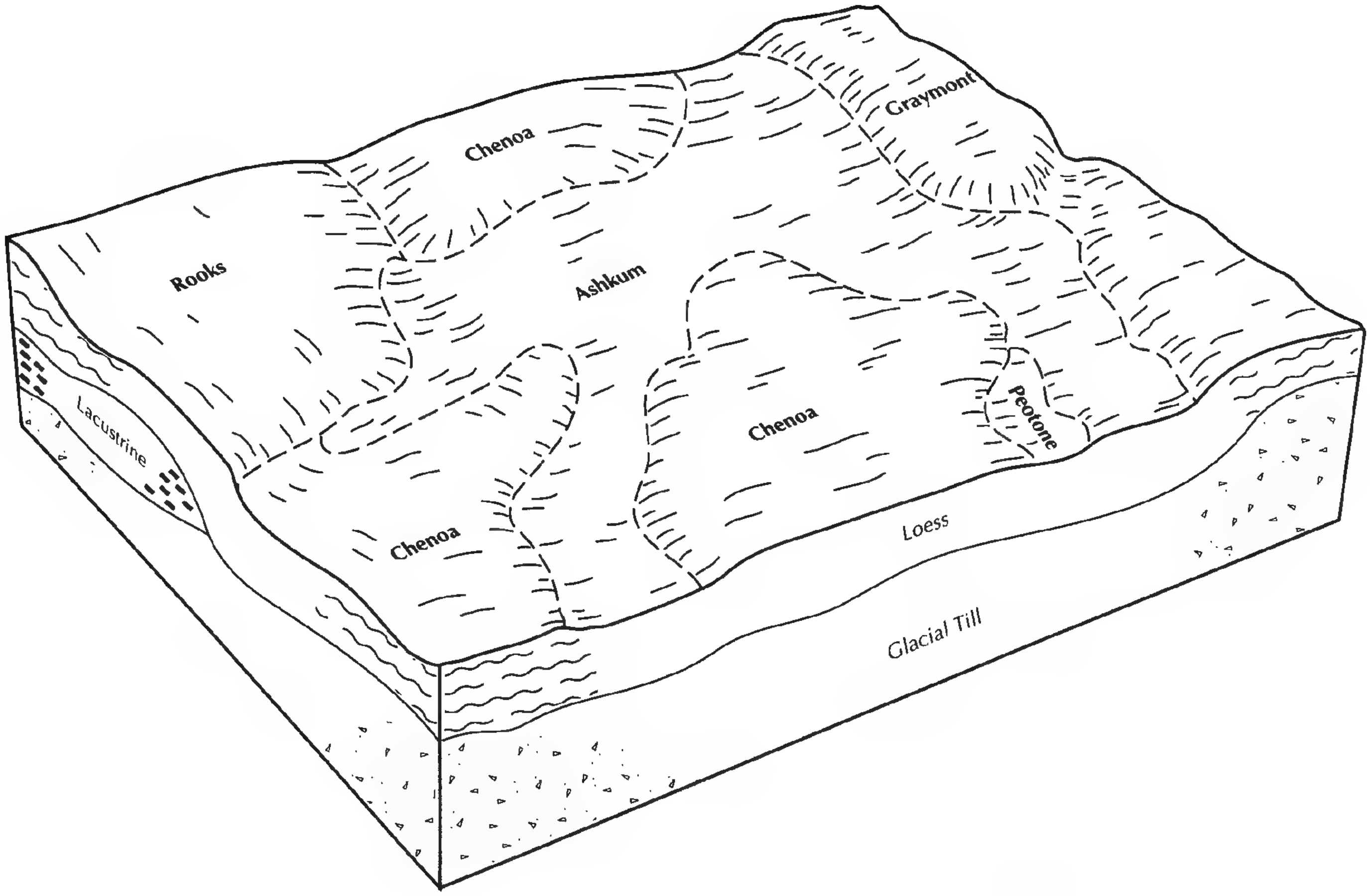

Figure 4.—Typical pattern of soils and parent material in the Ashkum-Chenoa association.

thinner subsoil that contains more clay than that of the Rutland soils.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The major management concerns are a seasonal high water table, ponding, the hazard of water erosion, and restricted permeability. Subsurface drains do not function well because of the restricted permeability. A surface drainage system generally is needed.

The major soils are poorly suited to use as sites for dwellings or for septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, and the restricted permeability.

Nearly Level to Sloping Soils That Are Moderately Permeable or Moderately Slowly Permeable in the Upper Part and Slowly Permeable in the Lower Part; on Till Plains

The major management needs in areas of these soils are surface and subsurface drainage systems and erosion control.

4. Ashkum-Chenoa Association

Nearly level and gently sloping, poorly drained and somewhat poorly drained, silty soils that formed in loess or local outwash and in the underlying glacial till

This association consists of Ashkum soils on broad flats and in shallow depressions and Chenoa soils on slight rises, ridges, and side slopes (fig. 4). The difference in elevation between the high and low areas ranges from about 5 to 30 feet.

This association makes up about 21 percent of the county. It is about 50 percent Ashkum soils, 30 percent Chenoa soils, and 20 percent soils of minor extent.

Ashkum soils are poorly drained. Typically, the surface soil is black, friable silty clay loam about 20 inches thick. The subsoil is about 27 inches thick. The upper part is dark grayish brown, mottled, friable silty clay loam. The next part is dark grayish brown and gray, mottled, firm silty clay loam. The lower part is gray, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay loam.

Chenoa soils are somewhat poorly drained. Typically, the surface layer is black, friable silty clay loam about 12 inches thick. The subsoil is about 24 inches thick. The upper part is brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, friable silty clay loam. The lower part is light olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam.

Of minor extent in this association are Andres, Rooks, Graymont, and Peotone soils. The somewhat poorly drained Andres soils are on slight rises. They have more sand in the subsoil than the Chenoa soils. The moderately well drained Graymont soils are on the steeper side slopes. They have less clay in the subsoil than the Chenoa soils. The somewhat poorly drained Rooks soils are on slight rises. They have less clay in the subsoil than the Chenoa soils. The very poorly drained Peotone soils are in depressions below the major soils.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The main management concerns are a seasonal high water table, ponding, restricted permeability, and the hazard of water erosion. A drainage system generally is needed. Subsurface drains function well in most areas.

The major soils are poorly suited to use as sites for dwellings or for septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, the restricted permeability, and a high shrink-swell potential.

5. Elliott-Ashkum Association

Nearly level to sloping, somewhat poorly drained and poorly drained, silty soils that formed in loess or local pedisediments and in the underlying glacial till

This association consists of Elliott soils on rises, ridges, and side slopes and Ashkum soils on broad flats and in shallow depressions (fig. 5). The difference in elevation between the low and high areas ranges from about 5 to 40 feet.

This association makes up about 11 percent of the county. It is about 49 percent Elliott soils, 45 percent Ashkum soils, and 6 percent soils of minor extent.

Elliott soils are somewhat poorly drained. Typically, the surface soil is black, friable silt loam and silty clay loam about 11 inches thick. The subsoil is about 30 inches thick. In sequence downward, it is light olive brown, friable silty clay; light olive brown, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silty clay loam.

Ashkum soils are poorly drained. Typically, the surface soil is black, friable silty clay loam about 20 inches thick. The subsoil is about 27 inches thick. The upper part is dark grayish brown, mottled, friable silty clay loam. The next part is dark grayish brown and gray, firm, silty clay loam. The lower part is gray, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay loam.

Of minor extent in this association are Andres and Varna soils. The somewhat poorly Andres soils are on slight rises. They have more sand in the subsoil than the major soils. The moderately well drained Varna soils are in landscape positions similar to those of the Elliott soils.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The main management concerns are a seasonal high water table, ponding, restricted permeability, and the hazard of water erosion. A drainage system generally is needed. Subsurface drains function well in most areas.

The major soils in this association are poorly suited to use as sites for dwellings or for septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, the restricted permeability, and a high shrink-swell potential.

6. Reddick-Andres-Symerton Association

Nearly level to sloping, poorly drained, somewhat poorly drained, and moderately well drained, loamy soils that formed in a thin layer of loess or in loamy outwash and in the underlying glacial till

This association consists of Reddick soils on broad flats and in shallow depressions, Andres soils on slight rises, and Symerton soils on ridges and side slopes. The difference in elevation between the low and high areas ranges from about 5 to 50 feet.

This association makes up about 11 percent of the county. It is about 35 percent Reddick soils, 35 percent Andres soils, 20 percent Symerton soils, and 10 percent soils of minor extent.

Reddick soils are poorly drained. Typically, the surface layer is black, friable clay loam about 11 inches thick. The subsoil is about 41 inches thick. The upper part is dark grayish brown, mottled, friable clay loam. The next part is grayish brown and gray, mottled, friable clay loam. The lower part is gray, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay loam.

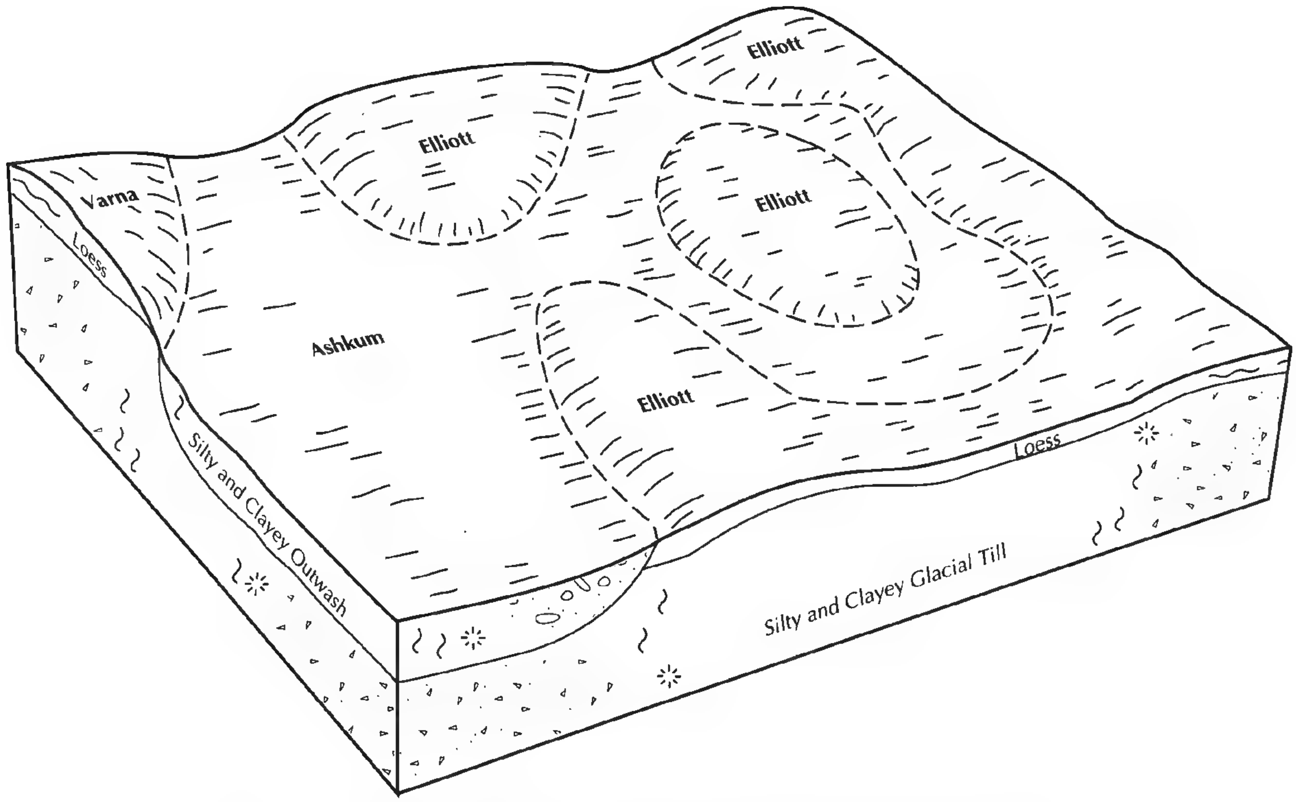

Figure 5.—Typical pattern of soils and parent material in the Elliott-Ashkum association.

Andres soils are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 11 inches thick. The subsoil is about 39 inches thick. In sequence downward, it is dark brown, mottled, friable clay loam; grayish brown, mottled, friable clay loam; grayish brown, mottled, friable silty clay loam; and light olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam.

Symerton soils are moderately well drained. Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. The subsoil is about 34 inches thick. In sequence downward, it is dark yellowish brown, friable clay loam; dark yellowish brown, mottled, friable silty clay loam; dark yellowish brown and brown, mottled, friable clay loam; and light olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam.

Of minor extent in this association are Ashkum and Chenoa soils. The poorly drained Ashkum soils are in landscape positions similar to those of the Reddick soils. They have more clay in the subsoil than the Reddick soils. The somewhat poorly drained Chenoa soils are on slight rises and side slopes. They have more clay in the subsoil than the Andres soils.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The main management concerns are a seasonal high water table, ponding, restricted permeability, and the hazard of water erosion.

Reddick and Andres soils are poorly suited to use as sites for dwellings or for septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, and the restricted permeability. Symerton soils are moderately suited to dwellings. The main management concerns are the seasonal high water table and the shrink-swell potential.

Nearly Level and Gently Sloping Soils That Are Moderately Permeable or Are Moderately Permeable in the Upper Part and Moderately Slowly Permeable in the Lower Part; on Outwash Plains and Till Plains

The major management needs in areas of these soils are surface and subsurface drainage systems and erosion control.

7. Drummer-Lisbon-Saybrook Association

Nearly level and gently sloping, poorly drained, somewhat poorly drained, and moderately well drained soils that formed in loess and in the underlying glacial outwash or glacial till

This association consists of Drummer soils on broad flats and in shallow depressions, Lisbon soils on slight rises, and Saybrook soils on ridges and side slopes. The difference in elevation between the low and high areas ranges from about 5 to 40 feet.

This association makes up about 4 percent of the county. It is about 49 percent Drummer soils, 24 percent Lisbon soils, 18 percent Saybrook soils, and 9 percent soils of minor extent.

Drummer soils are poorly drained. Typically, the surface soil is black, friable silty clay loam about 14 inches thick. The subsoil is about 36 inches thick. The upper part is dark gray, mottled, friable silty clay loam. The next part is dark grayish brown and grayish brown, mottled, friable silty clay loam. The lower part is grayish brown, mottled, friable, stratified silt loam and loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, stratified silt loam and loam.

Lisbon soils are somewhat poorly drained. Typically, the surface soil is very dark gray, friable silt loam about 13 inches thick. The subsoil is about 28 inches thick. In sequence downward, it is dark brown, mottled, friable silt loam; dark brown, mottled, friable silty clay loam; yellowish brown and brown, mottled, friable silty clay loam; and light olive brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, friable, calcareous silt loam.

Saybrook soils are moderately well drained. Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 13 inches thick. The subsoil is about 25 inches thick. In sequence downward, it is dark brown, friable silty clay loam; yellowish brown, mottled, friable silty clay loam; light olive brown, mottled, firm silt loam; and light olive brown, mottled, firm, calcareous silt loam. The underlying material to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silt loam.

Of minor extent in this association are Ashkum and Sawmill soils. The poorly drained Ashkum soils are in landscape positions similar to those of the Drummer soils. They contain more clay in the subsoil than the Drummer soils. The poorly drained Sawmill soils are on flood plains.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The main management concerns are a seasonal high water table, ponding, and the hazard of water erosion.

Drummer and Lisbon soils are poorly suited to dwellings and septic tank absorption fields. The main management concerns are the seasonal high water table, the ponding, and the restricted permeability. Saybrook soils are moderately suited to dwellings. The main management concerns are the seasonal high water table and the shrink-swell potential.

Nearly Level and Gently Sloping Soils That Are Moderately Permeable, Are Moderately Permeable in the Upper Part and Moderately Slowly Permeable in the Lower Part, or Are Moderately Slowly Permeable; on Lake Plains

The major management needs in areas of these soils are surface and subsurface drainage systems.

8. Patton-Harco Association

Nearly level, poorly drained and somewhat poorly drained, silty soils that formed in loess and calcareous lacustrine sediments

This association consists of Patton soils on broad flats and in shallow depressions and Harco soils on slight rises. The difference in elevation between the low and high areas ranges from about 5 to 40 feet.

This association makes up about 8 percent of the county. It is about 51 percent Patton soils, 38 percent Harco soils, and 11 percent soils of minor extent.

Patton soils are poorly drained. Typically, the surface soil is black and very dark gray, friable silty clay loam about 14 inches thick. The subsoil is about 27 inches thick. The upper part is grayish brown, mottled, friable silty clay loam. The next part is olive gray, mottled, friable silt loam. The lower part is olive gray, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam.

Harco soils are somewhat poorly drained. Typically, the surface soil is black, friable silty clay loam about 13 inches thick. The subsoil is about 22 inches thick. The upper part is very dark gray, mottled, friable silty clay loam. The next part is yellowish brown, mottled, friable silty clay loam. The lower part is yellowish brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, mottled, friable, calcareous silt loam.

Of minor extent in this association are Barrington and Sawmill soils. The moderately well drained Barrington soils are on ridges and side slopes. The poorly drained Sawmill soils are on flood plains.

Most areas of this association are used for cultivated

crops. The soils are well suited to the cultivated crops commonly grown in the county. The major management concerns are a seasonal high water table and ponding. A drainage system is needed. Subsurface drains generally function well.

The major soils are poorly suited to use as sites for dwellings or for septic tank absorption fields because of the seasonal high water table and the ponding.

9. Milford-Martinton Association

Nearly level and gently sloping, poorly drained and somewhat poorly drained, silty soils that formed in lacustrine sediments

This association consists of Milford soils on broad flats and in slight depressions and Martinton soils on slight rises, ridges, and side slopes. The difference in elevation between the low and high areas ranges from about 5 to 30 feet.

This association makes up about 4.7 percent of the county. It is about 53 percent Milford soils, 29 percent Martinton soils, and 18 percent soils of minor extent.

Milford soils are poorly drained. Typically, the surface soil is black and very dark gray, friable silty clay loam about 21 inches thick. The subsoil is about 22 inches thick. In sequence downward, it is dark gray, friable silty clay; dark grayish brown, mottled, friable silty clay; grayish brown, mottled, friable silty clay; and grayish brown, mottled, firm silty clay loam that is stratified with thin bands of clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm silty clay loam that is stratified with thin bands of clay loam.

Martinton soils are somewhat poorly drained. Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 12 inches thick. The subsoil is about 34 inches thick. In sequence downward, it is dark brown, friable silty clay loam; dark grayish brown, mottled, firm silty clay; grayish brown, mottled, firm silty clay loam; and grayish brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is grayish brown and yellowish brown, very friable, calcareous silty clay loam and sandy loam.

Of minor extent in this association are Wenona and Zook soils. The moderately well drained Wenona soils are on the steeper side slopes. The very poorly drained Zook soils are on flood plains.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The main management concerns are a seasonal high water table, ponding, and restricted permeability. A drainage system generally is needed. Subsurface drains generally function well.

The major soils are poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table, the ponding, and the restricted permeability.

Nearly Level to Sloping Soils That Have a Moderately Permeable Subsoil and Moderately Permeable, Moderately Rapidly Permeable, or Very Rapidly Permeable Underlying Material; on Stream Terraces and Outwash Plains

The major management needs in areas of these soils are subsurface drainage systems and erosion control.

10. Westland-Crane-Wea Association

Nearly level and gently sloping, poorly drained, somewhat poorly drained, and well drained soils that formed in loamy and gravelly glacial outwash

This association consists of Westland soils on broad flats and in depressions, Crane soils on slight rises, and Wea soils on slight rises, ridges, and side slopes (fig. 6). The difference in elevation between the low and high areas ranges from about 5 to 25 feet.

This association makes up about 3 percent of the county. It is about 36 percent Westland soils, 27 percent Crane soils, 26 percent Wea soils, and 11 percent soils of minor extent.

Westland soils are poorly drained. Typically, the surface soil is black and very dark gray, friable clay loam about 17 inches thick. The subsoil is about 32 inches thick. The upper part is dark grayish brown, mottled, friable clay loam. The lower part is dark grayish brown, mottled, friable, calcareous gravelly clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, loose, calcareous gravelly sand.

Crane soils are somewhat poorly drained. Typically, the surface soil is black, friable loam about 11 inches thick. The subsoil is about 44 inches thick. In sequence downward, it is dark grayish brown and brown, mottled, friable clay loam; brown, mottled, friable loam; grayish brown and gray, mottled, friable gravelly sandy loam; and yellowish brown, mottled, friable, calcareous gravelly sandy loam. The underlying material to a depth of 60 inches or more is brown, loose, calcareous very gravelly loamy coarse sand.

Wea soils are well drained. Typically, the surface soil is very dark grayish brown, friable loam about 12 inches thick. The subsoil is about 42 inches thick. The upper part is brown and dark yellowish brown, friable clay loam. The next part is dark yellowish brown, friable sandy clay loam, sandy loam, and gravelly sandy clay loam. The lower part is dark brown gravelly sandy clay loam. The underlying material to a depth of 60 inches or

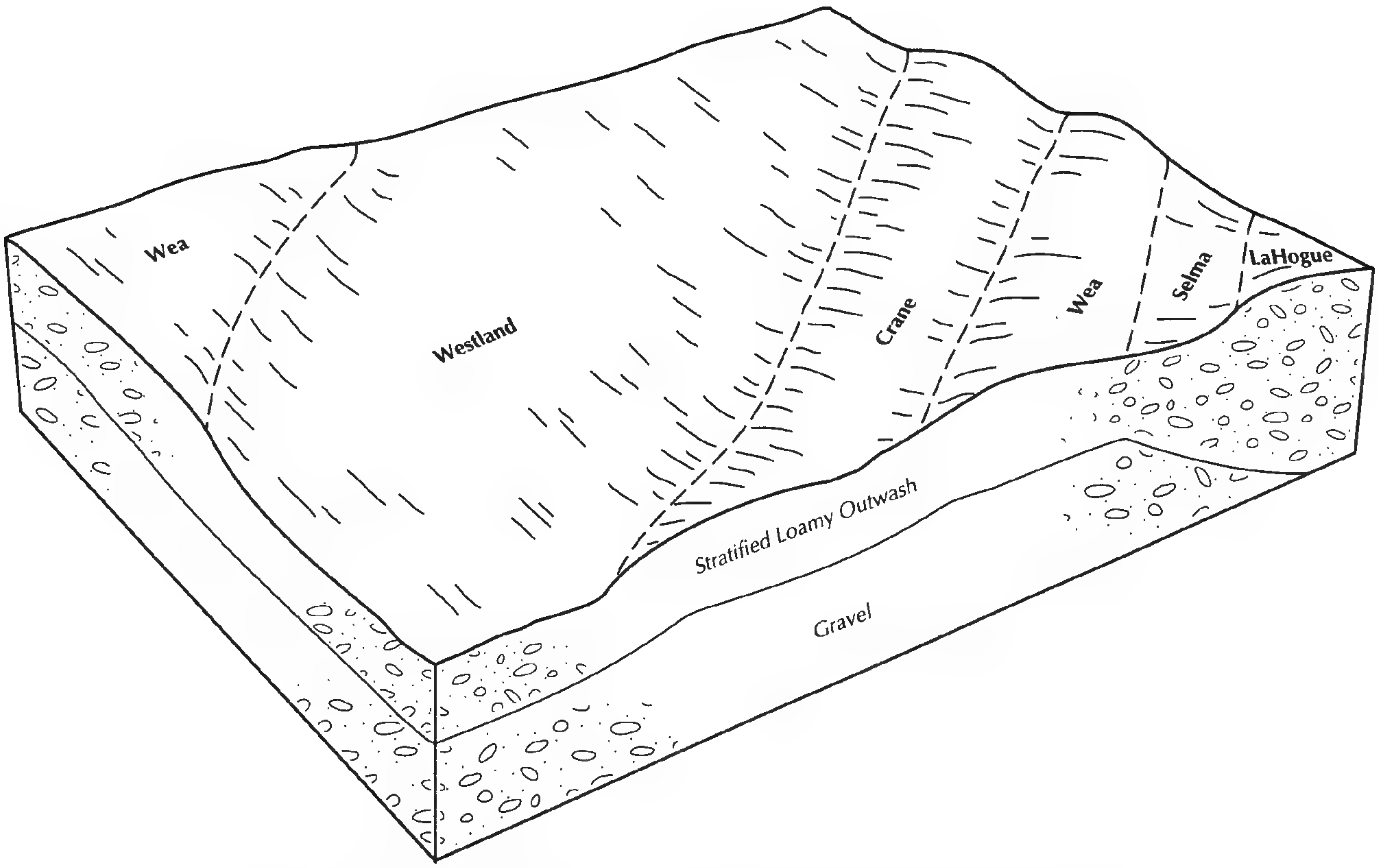

Figure 6.—Typical pattern of soils and parent material in the Westland-Crane-Wea association.

more is dark yellowish brown, loose, calcareous gravelly sand.

Of minor extent in this association are La Hogue and Selma soils. These soils contain less gravel in the underlying material than the major soils. The somewhat poorly drained La Hogue soils are in landscape positions similar to those of the Crane soils. The poorly drained Selma soils are in landscape positions similar to those of the Westland soils.

Most areas of this association are used for the cultivated crops commonly grown in the county. The major management concerns are a seasonal high water table and ponding. A drainage system is generally needed (fig. 7). Outlets for subsurface drains generally are not available. Surface drains are needed.

The major soils are moderately suited to dwellings and poorly suited to septic tank absorption fields. The main management concerns are the seasonal high water table and the ponding. The limitations of the Wea soils are less severe than those of the Westland and Crane soils.

11. Whitaker-Tuscola-Starks Association

Nearly level to sloping, somewhat poorly drained and moderately well drained, silty and loamy soils that formed in a thin layer of loess and in the underlying glacial outwash

This association consists of Whitaker soils on slight rises, Tuscola soils on ridges and side slopes, and Starks soils on slight rises. The difference in elevation between the low and high areas ranges from about 5 to 50 feet.

This association makes up about 3 percent of the county. It is about 16 percent Whitaker soils, 15 percent Tuscola soils, 10 percent Starks soils, and 59 percent soils of minor extent.

Whitaker soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown, friable loam about 9 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil is about 31 inches thick. The upper part is dark brown, mottled, friable clay loam. The next part is grayish

Figure 7.—A system of drainage ditches is used to lower the water table in the Westland-Crane-Wea association.

brown, mottled, friable sandy loam. The lower part also is grayish brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, loose loamy sand.

Tuscola soils are moderately well drained. Typically, the surface layer is dark brown, friable loam about 6 inches thick. The subsurface layer is brown, friable loam about 5 inches thick. The subsoil is about 39 inches thick. The upper part is dark brown and dark yellowish brown, friable clay loam. The next part is dark brown and strong brown, mottled, friable sandy clay loam. The lower part is grayish brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is dark brown, mottled, friable sandy loam.

Starks soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil is about 29 inches thick. In sequence downward, it is grayish brown and dark brown, mottled, friable silty clay loam; dark brown, mottled, friable silty clay loam; gray, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and grayish brown, mottled, friable silt loam and sandy loam. The underlying material to a depth of 60 inches or more is

grayish brown, mottled, very friable sandy loam.

Of minor extent in this association are Hennepin and Sawmill soils. The well drained Hennepin soils are on moderately steep and steep side slopes adjacent to the major soils. They formed in loamy glacial till. The poorly drained Sawmill soils formed in silty alluvium on flood plains. They are frequently flooded.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The major management concerns are the hazard of water erosion, a seasonal high water table, low fertility, and a moderately low content of organic matter.

The major soils generally are poorly suited to dwellings and septic tank absorption fields. The main management concern is the seasonal high water table. The limitations of the Tuscola soils are less severe than those of the Whitaker and Starks soils.

12. Selma-La Hogue-Jasper Association

Nearly level to sloping, poorly drained, somewhat poorly drained, and moderately well drained, loamy soils that formed in glacial outwash

This association consists of Selma soils on broad flats and in depressions, La Hogue soils on slight rises, and Jasper soils on slight rises, ridges, and side slopes. The difference in elevation between the low and high areas ranges from about 5 to 50 feet.

This association makes up about 3 percent of the county. It is about 44 percent Selma soils, 27 percent La Hogue soils, 22 percent Jasper soils, and 7 percent soils of minor extent.

Selma soils are poorly drained. Typically, the surface soil is black and very dark gray, friable clay loam about 16 inches thick. The subsoil is about 30 inches thick. The upper part is dark grayish brown, mottled, very friable clay loam. The next part is grayish brown, mottled, very friable clay loam. The lower part is grayish brown, mottled, very friable sandy loam. The underlying material to a depth of 60 inches or more is gray, mottled, loose loamy sand.

La Hogue soils are somewhat poorly drained. Typically, the surface layer is black, friable loam about 11 inches thick. The subsoil is about 31 inches thick. In sequence downward, it is dark grayish brown, mottled, friable loam; grayish brown, mottled, friable clay loam; grayish brown, mottled, very friable sandy loam; and grayish brown, mottled, very friable, stratified sandy loam and silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, loose, stratified loamy sand and sandy loam.

Jasper soils are moderately well drained. Typically, the surface soil is very dark gray, friable loam about 11 inches thick. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable clay loam. The next part is dark yellowish brown, friable sandy clay loam. The lower part is brown, friable sandy loam. The upper part of the underlying material is dark grayish brown, friable sandy loam. The lower part to a depth of 60 inches or more is yellowish brown and gray, loose, calcareous sand.

Of minor extent in this association are Brenton and Thorp soils. The somewhat poorly drained Brenton soils are in landscape positions similar to those of the La Hogue soils. They have less sand in the subsoil than the La Hogue soils. The poorly drained Thorp soils are in closed depressions. They contain less sand in the subsoil than the Selma soils.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. The major management concerns are a seasonal high water table and ponding in areas of the Selma and La Hogue soils and the hazard of water erosion in areas of the Jasper soils.

The major soils generally are poorly suited to use as sites for dwellings or for septic tank absorption fields. The seasonal high water table and the ponding are limitations. The limitations of the Jasper soils are less severe than those of the Selma and La Hogue soils.

Broad Land Use Considerations

The soils in Livingston County range widely in their suitability for major land uses. More than 93 percent of the acreage is used for cultivated crops, dominantly corn and soybeans. A small acreage is used for wheat, small grain, pasture, or hay. Most of the acreage is cultivated.

A seasonal high water table and ponding are the major limitations if the soils in association 8 are used for crops. The hazard of water erosion and the seasonal high water table are the major limitations in associations 10, 11, and 12. Low fertility and a low content of organic matter are additional limitations in areas of association 11. The hazard of water erosion, the seasonal high water table, and restricted permeability are the major limitations in areas of associations 1, 2, 3, 4, 5, 6, 7, and 9.

A small acreage in the county is used for pasture. The major soils in all of the associations are suitable for grasses and legumes. The seasonal high water table is a limitation on many of the soils. Water-tolerant grasses are suitable on these soils.

Only about 0.1 percent of the acreage in the county is woodland. Most of the woodland is along major drainageways in association 11, where some of the minor soils are moderately steep and steep. Other small

wooded areas adjacent to creeks and streams are in most of the other associations. The major management concern is an equipment limitation on the steeper slopes.

A few areas in the county are developed for urban uses. Most of the major soils in the county are poorly suited to building site development. The seasonal high water table, the ponding, the shrink-swell potential, and the potential for frost action are the main management concerns. The minor soils in association 11 are generally unsuitable for urban development. Flooding is a concern in areas of the Sawmill soils, and the slope is a limitation in areas of the Hennepin soils. Overcoming these limitations commonly is very expensive. Generally, each association has small areas of minor soils that are well suited or moderately suited to building site development.

Private sewage disposal systems are needed throughout much of the county. The seasonal high water table, the ponding, and the restricted permeability are the main management concerns. Generally, each association has small areas of minor soils that are well suited or moderately suited to sewage disposal systems.

The soils range from well suited to unsuited to recreational development. The suitability depends partly on the intensity of the expected use. The seasonal high water table, flooding, the ponding, and the restricted permeability are limitations affecting recreational uses. All of the associations are suitable for some recreational uses, such as paths and trails for hiking or horseback riding. Association 11 is in scenic areas and has small tracts of woodland that provide a natural setting for paths and trails, camp areas, and picnic areas.

The suitability for wildlife habitat generally is good throughout the county. All of the associations have good potential for the development of wetland wildlife habitat and openland wildlife habitat. Association 11 has good potential for both wetland wildlife habitat and woodland wildlife habitat.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Clarence silty clay loam, 2 to 4 percent slopes, eroded, is a phase of the Clarence series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

23A—Blount silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad ridges on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsurface layer is grayish brown, friable silt loam about 6 inches thick. The subsoil is about 19 inches thick. The upper part is brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, friable silty clay. The lower part is light olive brown, mottled, friable, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown and light gray, firm, calcareous silty clay loam. In some areas the depth to glacial till is greater. In a few places the lower part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Blount soil at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content and the shrink-swell potential also are moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It

is poorly suited to timber production and to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Surface ditches or subsurface drains can lower the water table. Measures that maintain or improve the drainage system are needed. Erosion is a hazard in areas where slopes are very long. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, increase the rate of water infiltration, and reduce the hazard of erosion.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used for timber production, seedling mortality and windthrow are management concerns because of the high clay content of the soil. Seedling mortality can be minimized by planting species that can tolerate excessive moisture conditions. Harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the hazard of windthrow. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the stand. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

23B—Blount silt loam, 2 to 4 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is grayish brown, friable silt loam about 4 inches thick. The subsoil is about 24 inches thick. The upper part is brown, mottled, firm silty clay loam. The next part is grayish brown, mottled, firm silty clay loam. The lower part is light olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, very firm, calcareous silty clay loam. In some places, the surface layer is thinner and tillage has mixed the upper part of the subsoil with the surface layer. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Blount soil at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content and the shrink-swell potential also are moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to timber production and to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration. Subsurface drains can be used to lower the water table if suitable outlets are available.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or

clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used for timber production, seedling mortality and windthrow are management concerns because of the high clay content of the soil. Seedling mortality can be minimized by planting species that can tolerate excessive moisture conditions. Harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the stand. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

25E—Hennepin silt loam, 12 to 20 percent slopes. This moderately steep, well drained soil is on short, uneven side slopes on till plains in areas adjacent to flood plains. Individual areas are long and narrow and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 14 inches thick. The upper part is dark brown, friable silt loam. The lower part is brown, firm, calcareous silt loam. The underlying material to a depth of 60 inches or more is brown, firm, calcareous silt loam. In some places the surface layer is thicker. In other places the subsoil is thinner. In a few places the seasonal high water table is within a depth of 6 feet. In some areas the subsoil contains more sand.

Water and air move through this soil at a moderately slow rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for recreation, timber production, or wildlife habitat. This soil is generally unsuited to cultivated crops because of the slope. It is moderately suited to pasture but is poorly suited to hay. It is generally unsuited to dwellings and septic tank absorption fields because of the slope and the restricted permeability. It is well suited to timber production and woodland wildlife habitat.

Erosion control is needed in areas where grasses and legumes are being established. In areas where the pasture is already established, interseeding legumes using a no-till system of seeding and seeding on the contour improve forage quality and reduce the hazard of erosion. A permanent cover of pasture plants helps to control erosion and maintains tilth. Selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used for timber production, the erosion hazard and the equipment limitation are management concerns because of the slope and the high clay content of the soil. Plant competition is also a management concern. It affects the seedlings of desirable species. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. The use of machinery is limited to periods when the soil is firm enough to support the equipment and dry enough to provide the needed traction. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

This soil has good potential for use as habitat for woodland wildlife and fair potential for use as habitat for openland wildlife. Adequate stands of herbaceous cover can be maintained, but the slope and low fertility limit the extent of grain and seed crops. Protection from fire and grazing is essential.

The land capability classification is VIe.

25F—Hennepin silt loam, 20 to 35 percent slopes. This steep, well drained soil is on short, uneven side slopes on till plains in areas adjacent to flood plains. Individual areas are long and narrow and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 18 inches thick. It is brown, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous silt loam. In some places the surface layer is thicker. In other places the subsoil is thinner. In some areas the subsoil contains more sand.

Included with this soil in mapping are small areas of the moderately well drained St. Clair soils. These soils are in landscape positions similar to those of the Hennepin soil. They have more clay in the subsoil than the Hennepin soil. They make up 5 to 10 percent of the unit.

Water and air move through the Hennepin soil at a moderately slow rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for recreation, timber production, or wildlife habitat. This soil is generally unsuited to cultivated crops because of the slope. It is moderately suited to pasture but is poorly suited to hay. It is generally unsuited to dwellings and septic tank absorption fields because of the slope and the restricted permeability. It is well suited to timber production and woodland wildlife habitat.

If this soil is used for timber production, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Wooded areas of this soil provide habitat for deer, squirrels, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and the hazard of erosion.

The land capability classification is VIe.

59—Lisbon silt loam. This nearly level, somewhat poorly drained soil is on slight rises on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 13 inches thick. The subsoil is about 28 inches thick. In sequence downward, it is dark brown, mottled, friable silt loam; dark brown, mottled, friable silty clay loam; yellowish brown and brown, mottled, friable silty clay loam; and light olive brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, friable, calcareous silt loam. In some places the depth to glacial till is greater. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer and moderately well drained Saybrook soils. Drummer soils are in the lower positions on the landscape and in drainageways. Saybrook soils are in the higher, more sloping positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Lisbon soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted

permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

60C2—La Rose loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on short, uneven side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 7 inches thick. The subsoil is about 17 inches thick. The upper part is dark brown, mottled, friable silty clay loam. The next part is brown, mottled, friable silty clay loam. The lower part is brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous silt loam. In places the surface layer contains more clay. In some areas the subsoil contains more sand. In other areas the depth to calcareous glacial till is greater.

Included with this soil in mapping are small areas of Reddick soils and small areas where the surface has been eroded and the glacial till is exposed. The poorly drained Reddick soils are in the lower positions on the landscape and in drainageways. Included areas make up 5 to 10 percent of the unit.

Water and air move through the La Rose soil at a moderate rate. Surface runoff is medium. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these helps to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and minimize crusting.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps to control erosion. The plants should not be grazed until they are sufficiently established. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer minimize surface compaction and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Vegetation is difficult to establish in areas where the glacial till is exposed. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing the plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction is completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

The restricted permeability is a moderate limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

67—Harpster silty clay loam. This nearly level, poorly drained soil is in shallow depressions on outwash plains and till plains. It is ponded for brief periods in the spring. Individual areas are long and narrow or are oval and range from 3 to 20 acres in size.

Typically, the surface soil is black and very dark gray, friable, calcareous silty clay loam about 16 inches thick. The subsoil is about 28 inches thick. The upper part is dark gray, friable, calcareous silty clay loam. The next part is light brownish gray, mottled, friable, calcareous silty clay loam. The lower part is light brownish gray, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is gray, mottled, friable, calcareous silt loam. In some areas the depth to free carbonates is greater than 16 inches. In some places the underlying material contains more sand. In other places the surface soil is more than 24 inches thick.

Water and air move through this soil at a moderate rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is

high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting in some years. The high content of lime in the surface layer hinders germination and decreases the availability of applied phosphorus and potassium and other plant nutrients. Applying fertilizer at a rate that is higher than normal helps to overcome this limitation. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum improves tilth and fertility, minimizes crusting, and increases the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

69—Milford silty clay loam. This nearly level, poorly drained soil is on broad flats and in slight depressions on glacial lake plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 700 acres in size.

Typically, the surface soil is black and very dark gray, friable silty clay loam about 21 inches thick. The subsoil is about 22 inches thick. In sequence downward, it is dark gray, friable silty clay; dark grayish brown, mottled, friable silty clay; grayish brown, mottled, friable silty clay; and grayish brown, mottled, firm silty clay loam that is stratified with thin bands of clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm silty clay loam that is stratified with thin bands of clay loam. In places the surface layer contains more clay. In some areas the underlying material is silt loam or silty clay loam till. In other areas the subsoil and the underlying material contain more sand.

Included with this soil in mapping are small areas of Peotone soils. These soils are in the deeper depressions and are ponded for longer periods in the spring than the Milford soil. They make up 2 to 5 percent of the unit.

Water and air move through the Milford soil at a moderately slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high. The surface layer can be easily tilled only within a narrow range in moisture content. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting in some years. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

91A—Swygert silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises and ridges on till plains. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface layer is black and very dark gray, friable silty clay loam about 14 inches thick. The subsoil is about 27 inches thick. The upper part is light olive brown, mottled, firm silty clay. The lower part is light olive brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light olive brown, mottled, very firm, calcareous silty clay. In places the surface layer contains less clay. In some areas the subsoil contains less clay. In other areas the surface soil is thinner and lighter in color and has been mixed with the subsoil through tillage. In a few places the subsoil has more sand. In some areas the subsoil is thinner.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in the lower positions on the landscape and in drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Swygert soil at a slow rate and through the lower part at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some

years. Erosion is a hazard in areas where slopes are very long. The seasonal high water table can be lowered by surface ditches or subsurface drains. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, increase the rate of water infiltration, and reduce the hazard of erosion.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table and the shrink-swell potential are severe limitations. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Grading and land shaping help to remove surface water. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

91B—Swygert silty clay loam, 2 to 4 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface soil is black, friable silty clay loam about 11 inches thick. The subsoil is about 39 inches thick. The upper part is dark grayish brown and grayish brown, mottled, firm silty clay loam. The lower part is grayish brown and light gray, very firm silty clay. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous silty clay. In places the surface layer contains less clay. In some areas the subsoil is thinner. In other areas the surface layer has been mixed with the upper part of the subsoil. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Bryce and moderately well drained Chatsworth soils. Bryce soils are in the lower positions on the landscape and in drainageways. Chatsworth soils are more sloping than the Swygert soil and are calcareous near the surface. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Swygert soil at a slow rate and through the lower part at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration. Subsurface drains can lower the seasonal high water table if suitable outlets are available.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table and the shrink-swell potential are severe limitations. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept water and reduces the wetness. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The

design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

91B2—Swygert silty clay loam, 2 to 4 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsoil is about 41 inches thick. In sequence downward, it is dark brown, mottled, firm silty clay loam; brown, mottled, firm silty clay; grayish brown, mottled, firm silty clay; grayish brown, mottled, firm, calcareous silty clay; and light olive brown and gray, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light olive brown, mottled, very firm, calcareous silty clay. In some places the subsoil is thinner. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Bryce and moderately well drained Chatsworth soils. Bryce soils are in the lower positions on the landscape and in drainageways. Chatsworth soils are more sloping than the Swygert soil and are calcareous near the surface. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Swygert soil at a slow rate and through the lower part at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential and the potential for frost action are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a concern. The seasonal high water table delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration (fig. 8). Subsurface drains can lower the seasonal high water table.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table and the shrink-swell potential are severe limitations. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept water and reduces the wetness. A septic tank system will function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

102A—La Hogue loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains. Individual areas are irregular in shape and range from 3 to 75 acres in size.

Typically, the surface layer is black, friable loam about 11 inches thick. The subsoil is about 31 inches thick. In sequence downward, it is dark grayish brown, mottled, friable loam; dark grayish brown, mottled, friable clay loam; grayish brown, mottled, very friable sandy loam; and grayish brown, mottled, very friable, stratified sandy loam and silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, loose, stratified loamy sand and sandy loam. In places the surface layer contains more sand or silt. In some areas the subsoil contains more clay. In other areas the underlying material contains fine gravel. In some places the subsoil is thinner.

Included with this soil in mapping are small areas of the well drained Jasper and poorly drained Selma soils. Jasper soils are in the higher, more sloping positions on the landscape. Selma soils are in the lower positions on the landscape and in drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the La

Figure 8.—Terraces in an area of Swygert silty clay loam, 2 to 4 percent slopes, eroded.

Hogue soil at a moderate rate and through the underlying material at a moderately rapid rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table is a severe limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

125—Selma clay loam. This nearly level, poorly drained soil is on broad flats and in shallow depressions on outwash plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 40 to 300 acres in size.

Typically, the surface soil is black and very dark gray, friable clay loam about 16 inches thick. The subsoil is about 30 inches thick. The upper part is dark grayish brown, mottled, very friable clay loam. The next part is grayish brown, mottled, very friable clay loam. The lower part is grayish brown, mottled, very friable sandy loam. The underlying material to a depth of 60

inches or more is gray, mottled, loose loamy sand. In places the surface layer contains more sand. In some areas the subsoil contains more clay and less sand. In other areas the underlying material contains more gravel.

Water and air move through the upper part of the Selma soil at a moderate rate and through the underlying material at a moderately rapid rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting in some years. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

131B—Alvin fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex dunes on outwash plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark brown, very friable fine sandy loam about 7 inches thick. The subsoil is about 30 inches thick. The upper part is yellowish brown, very friable fine sandy loam. The lower part is yellowish brown and dark brown, mottled, very friable loamy fine sand. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, loose loamy sand. In places the subsoil contains more clay. In some areas the surface layer has less fine sand or is thinner and has been mixed with the subsoil.

Included with this soil in mapping are small areas of the poorly drained Selma and somewhat poorly drained Whitaker soils. These soils are fine-loamy. Selma soils are in the lower positions on the landscape and in drainageways. They contain more organic matter in the surface layer than the Alvin soil. Whitaker soils are in the slightly lower positions on the landscape. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the subsoil in the Alvin soil at a moderate rate and through the lower part of the subsoil and the underlying material at a moderately rapid rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 6 feet in the spring. Available water capacity is moderate. Organic matter content is very low. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to timber production. It is well suited to dwellings without basements and moderately suited to dwellings with basements. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. Also, the moderate available water capacity is a limitation. Crop yields are significantly reduced during periods of low rainfall. Contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and soil blowing and conserve moisture. An adequate liming program is needed to increase the naturally low pH of the upper part of this soil. Selecting species that can tolerate drought or that mature before the periods of dry weather helps to overcome the limited available water capacity. Seeding fewer plants per acre conserves moisture and increases the likelihood of seedling survival. Field windbreaks reduce the hazard of soil blowing. This soil is suited to irrigation, and a source of water is generally available.

In areas used for pasture, droughtiness and soil blowing are hazards and low fertility is a limitation. Selecting drought-tolerant grasses and legumes for planting helps to maintain forage stands. Fertilizer should be applied frequently and in small amounts. This method of application minimizes the loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control soil blowing.

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level

above the building helps to lower the seasonal high water table.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a severe limitation and the seasonal high water table is a moderate limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Subsurface tile drains help to lower the water table. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

132A—Starks silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains and stream terraces. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil is about 29 inches thick. In sequence downward, it is grayish brown and dark brown, mottled, friable silty clay loam; dark brown, mottled, friable silty clay loam; gray, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and grayish brown, mottled, friable silt loam and sandy loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very friable sandy loam that has thin strata of loamy sand. In some places the depth to the underlying material is greater. In a few places the subsoil has more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer and moderately well drained Camden soils. Drummer soils are in the lower positions on the landscape and in drainageways. Camden soils are in the higher positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Starks soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to timber production. It is poorly suited to dwellings with and without basements and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable species can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table is a severe limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains can lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

134B—Camden silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on outwash plains and stream terraces. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface

layer also is dark grayish brown, friable silt loam. It is about 6 inches thick. The subsoil is about 34 inches thick. The upper part is dark yellowish brown and yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, friable silty clay loam. The lower part is yellowish brown, mottled, friable silt loam and very fine sandy loam. The underlying material to a depth of 60 inches or more also is yellowish brown, mottled, friable silt loam and very fine sandy loam. In some places the subsoil is thinner. In a few places the subsoil contains more sand. In some areas the surface layer is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the poorly drained Selma and somewhat poorly drained Starks soils. These soils are in the lower positions on the landscape. Selma soils contain more sand in the subsoil than the Camden soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Camden soil at a moderate rate. Surface runoff is medium. A seasonal high water table is at a depth of 4 to 6 feet in the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to timber production and to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a moderate limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

141A—Wesley fine sandy loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on till plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil is black and very dark grayish brown, friable fine sandy loam about 13 inches thick. The subsoil is about 25 inches thick. In sequence downward, it is dark brown, mottled, friable fine sandy loam; yellowish brown, mottled, friable fine sandy loam; yellowish brown, mottled, friable loamy fine sand; brown, mottled, friable, calcareous loamy fine sand; and grayish brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm, calcareous silty clay loam. In places the surface layer contains more or less sand. In some areas the subsoil contains more clay. In other areas the surface layer is thinner.

Included with this soil in mapping are small areas of the poorly drained Ashkum and Reddick soils. These soils are in the lower positions on the landscape and in drainageways. Ashkum soils are fine textured, and Reddick soils are fine-loamy. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Wesley soil at a moderately rapid rate and through the lower part at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is low. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table can delay planting in the

spring. During periods of low rainfall, soil blowing is a hazard and the moderate available water capacity is a limitation. Surface ditches and subsurface drains help to remove excess water. A conservation tillage system that leaves crop residue on the surface after planting helps to control soil blowing, conserves moisture, and improves fertility. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. Field windbreaks reduce the hazard of soil blowing. This soil is suited to irrigation, and a source of water is generally available.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table, the restricted permeability, and the poor filtering capacity of the subsoil are severe limitations. Grading and land shaping help to remove surface water. Subsurface tile drains help to lower the water table. The subsoil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

142—Patton silty clay loam. This nearly level, poorly drained soil is on broad flats and in shallow depressions and drainageways on lake plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 500 acres in size.

Typically, the surface soil is black and very dark gray, friable silty clay loam about 14 inches thick. The subsoil is about 27 inches thick. The upper part is grayish brown, mottled, friable silty clay loam. The next part is olive gray, mottled, friable silt loam. The lower part is olive gray, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam. In some places the subsoil and underlying material contain more sand.

Included with this soil in mapping are small areas of Harpster and Pella soils in depressions. Harpster soils have carbonates in the surface layer. Pella soils have carbonates within a depth of 16 inches. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Patton soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high. The surface layer can be easily tilled only within a narrow range in moisture content.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting in some years. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

145B—Saybrook silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 13 inches thick. The subsoil is about 25 inches thick. In sequence downward, it is dark brown, friable silty clay loam; yellowish brown, mottled, friable silty clay loam; light olive brown, mottled, firm silt loam; and light olive brown, mottled, firm, calcareous silt loam. The underlying material to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silt loam. In some places the depth to glacial till is greater. In other places the subsoil contains more sand. In some areas the surface layer is thinner, contains more clay, and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Lisbon soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the Saybrook soil at a moderate rate. Surface runoff is medium. A seasonal high water table is at a depth of 4 to 6 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is

well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

The restricted permeability and the seasonal high water table are moderate limitations if this soil is used as a site for septic tank absorption fields. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

146A—Elliott silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises and broad ridges on till plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface soil is black, friable silt loam about 11 inches thick. The subsoil is about 30 inches thick. In sequence downward, it is light olive brown, friable silty clay; light olive brown, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silty clay loam. In some places the depth to glacial till is greater. In a few places the upper part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ashkum and moderately well drained Varna soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Varna soils are in the more sloping positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the subsoil of the Elliott soil at a moderately slow rate and through the underlying material at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Erosion is a hazard in areas where slopes are very long. The seasonal high water table can be lowered by surface ditches or subsurface drains. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, increase the rate of water infiltration, and reduce the hazard of erosion.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

146B—Elliott silt loam, 2 to 4 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is black, friable silt loam about 12 inches thick. The subsoil is about 30 inches thick. The upper part is yellowish brown, mottled, firm silty clay loam. The lower part is grayish brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is calcareous

silty clay loam glacial till. In some places the surface layer has been mixed with the upper part of the subsoil through tillage. In a few places the upper part of the subsoil contains more sand. In some areas the depth to glacial till is greater.

Included with this soil in mapping are small areas of the poorly drained Ashkum and moderately well drained Varna soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Varna soils are in the more sloping positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the subsoil of the Elliott soil at a moderately slow rate and through the underlying material at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields. After hard rains a crust commonly forms on the surface.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration. Subsurface drains can lower the seasonal high water table if suitable outlets are available.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

146B2—Elliott silty clay loam, 2 to 4 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 10 inches thick. The subsoil is about 16 inches thick. The upper part is olive brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, friable silty clay loam. The lower part is light olive brown, mottled, friable, calcareous silty clay loam. In some places nearly all of the surface layer has been removed as a result of erosion. In a few places the upper part of the subsoil contains more sand. In some areas the depth to glacial till is greater.

Included with this soil in mapping are small areas of the poorly drained Ashkum and moderately well drained Varna soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Varna soils are in the more sloping positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the subsoil of the Elliott soil at a moderately slow rate and through the underlying material at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields. After hard rains a crust commonly forms on the surface.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. The seasonal high water table delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting,

and increases the rate of water infiltration. Subsurface drains can lower the seasonal high water table if suitable outlets are available.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

146C2—Elliott silty clay loam, 4 to 7 percent slopes, eroded. This sloping, somewhat poorly drained soil is on side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 10 inches thick. The subsoil is about 22 inches thick. The upper part is dark yellowish brown, mottled, firm silty clay loam. The next part is dark brown, mottled, firm, calcareous silty clay loam. The lower part is yellowish brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, very firm, calcareous silty clay loam. In some places the surface soil is thinner and lighter in color. In other places the subsoil contains more sand. In some areas nearly all of the surface layer has been removed as a result of erosion.

Included with this soil in mapping are small areas of the poorly drained Ashkum and moderately well drained Varna soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Varna soils are in landscape positions similar to those of the Elliott soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the subsoil of the Elliott soil at a moderately slow rate and through the underlying material at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and is well suited to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. The seasonal high water table delays planting in some years. Seeps on the sides of hills are common in wet years. Contour farming, terraces, a crop rotation dominated by forage crops, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration. Subsurface drains can lower the seasonal high water table if suitable outlets are available.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile

drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

147A—Clarence silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises and broad ridges on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 13 inches thick. The subsoil is about 15 inches thick. The upper part is dark grayish brown, mottled, very firm silty clay. The next part is grayish brown, mottled, very firm clay. The lower part is grayish brown, mottled, very firm, calcareous clay. The underlying material to a depth of 60 inches or more also is grayish brown, mottled, very firm, calcareous clay. In some places the depth to glacial till is greater. In other places the surface layer is thinner. In a few areas the upper part of the subsoil contains less clay. In other areas the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Rowe soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Clarence soil at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is low. Organic matter content is high. The shrink-swell potential and the potential for frost action are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. The moderate available water capacity, poor tilth, and a restricted root zone are management concerns. Erosion is a hazard in areas where slopes are very long. Surface ditches help to lower the seasonal high water table. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. A conservation tillage system that leaves crop residue on the surface after planting helps to control erosion and conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Grading and land shaping help to remove surface water. Subsurface tile drains help to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIw.

147B2—Clarence silty clay loam, 2 to 4 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 27 inches thick. The upper part is dark brown, mottled, firm silty clay loam. The next part is dark grayish brown and grayish brown, mottled, firm silty clay. The lower part is light olive brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light olive brown, mottled, very firm, calcareous silty clay. In some places the subsoil is thinner. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the moderately well drained Chatsworth and poorly drained Rowe soils. Chatsworth soils are on steeper

slopes than the Clarence soil. Also, they have a thinner subsoil. Rowe soils are in the lower positions on the landscape and in drainageways. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Clarence soil at a very slow rate. Surface runoff is rapid. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is low. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is hazard. The moderate available water capacity, poor tilth, and a restricted root zone are management concerns. The seasonal high water table delays planting in some years. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation dominated by forage crops help to control erosion. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage resulting from the limited available water capacity and the restricted root zone. Leaving crop residue on the surface conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction. Surface ditches help to lower the seasonal high water table.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. A septic tank system will function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

147C2—Clarence silty clay loam, 4 to 7 percent slopes, eroded. This sloping, somewhat poorly drained soil is on side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsoil is about 19 inches thick. The upper part is olive brown, mottled, firm silty clay. The lower part is olive brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is olive gray, mottled, very firm, calcareous silty clay. In some areas the subsoil is thinner. In a few places the upper part of the subsoil contains less clay. In other places the subsoil contains more sand. In some areas nearly all of the surface layer has been removed as a result of erosion.

Included with this soil in mapping are small areas of the moderately well drained Chatsworth and poorly drained Rowe soils. Chatsworth soils contain less organic matter than the Clarence soil and are calcareous closer to the surface. Rowe soils are in the lower positions on the landscape and in drainageways. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Clarence soil at a very slow rate. Surface runoff is rapid. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is low. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. The moderate available water capacity, poor tilth, and a restricted root zone are management concerns. The seasonal high water table delays planting in some years. A conservation tillage system that leaves crop residue on the surface after

planting, terraces, contour farming, and a crop rotation dominated by forage crops help to control erosion. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. Leaving crop residue on the surface conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction. Subsurface tile drains help to lower the seasonal high water table.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

148B—Proctor silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil is very dark grayish brown and dark brown, friable silt loam about 15 inches thick. The subsoil is about 30 inches thick. The upper part is dark brown, friable silty clay loam. The next part is dark brown, firm silty clay loam. The lower part is dark brown, very firm clay loam. The underlying material to a depth of 60 inches or more is dark brown, friable, calcareous sandy loam. In places the subsoil is thinner. In a few areas the subsoil contains more sand. In some places the surface layer is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the somewhat poorly drained Brenton and poorly drained Drummer soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the Proctor soil at a moderate rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 5 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

149A—Brenton silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 12 inches thick. The subsoil is about 32 inches thick. In sequence downward, it is dark grayish brown and brown, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; grayish

brown, mottled, friable clay loam; and grayish brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very friable, stratified sandy loam and loamy sand. In some areas the subsoil contains more sand. In other areas the surface layer contains less organic matter.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in the lower positions on the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the Brenton soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table is a severe limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

150B—Onarga fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges on outwash plains and stream terraces. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface soil is very dark grayish brown, very friable fine sandy loam about 17 inches thick. The subsoil is about 24 inches thick. The upper part is brown, very friable fine sandy loam. The lower part is yellowish brown, mottled, very friable loamy fine sand. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, loose, stratified loam and loamy sand. In places the underlying material contains more clay. In some areas the surface layer is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville and poorly drained Selma soils. These soils are in the lower positions on the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Onarga soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium. A seasonal high water table is at a depth of 2.5 to 6.0 feet in the spring. Available water capacity and organic matter content are moderate. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is well suited to dwellings without basements and moderately suited to dwellings with basements. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. Also, the moderate available water capacity is a limitation during periods of low rainfall. Contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and soil blowing and conserve moisture. Selecting crops and crop species that can tolerate drought or that mature before the periods of dry weather helps to overcome the limited available water capacity. Seeding fewer plants per acre conserves moisture and increases the likelihood of seedling survival. Field windbreaks reduce the hazard of soil blowing. This soil is suited to irrigation, and a source of water is generally available.

In areas used for pasture, droughtiness and low fertility are limitations and soil blowing is a hazard. Selecting drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands. Fertilizer should be applied frequently and in small amounts. This method of application minimizes the loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control soil blowing.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level

above the building helps to lower the seasonal high water table.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity and the seasonal high water table are severe limitations. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. A septic system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Subsurface tile drains help to lower the water table. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

150C—Onarga fine sandy loam, 5 to 10 percent slopes. This sloping, moderately well drained soil is on side slopes on outwash plains and stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 10 inches thick. The subsoil is about 37 inches thick. The upper part is dark yellowish brown, very friable fine sandy loam. The next part is yellowish brown, mottled, very friable fine sandy loam. The lower part is dark brown, mottled, very friable fine sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, loose loamy fine sand. In some places the surface soil is thinner and lighter in color and has been mixed with the subsoil. In other places the subsoil contains more sand. In a few areas silt loam or silty clay loam glacial till is below a depth of 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville and poorly drained Selma soils. Ridgeville soils are in nearly level areas. Selma soils are in the lower positions on the landscape and in drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Onarga soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium. A seasonal high water table is at a depth of 2.5 to 6.0 feet in the spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is well suited to dwellings without basements and moderately suited to dwellings with basements. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. Also, the moderate available water capacity is a limitation. Crop yields are significantly reduced during periods of low rainfall. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and soil blowing and conserve moisture. Selecting crops and crop species that can tolerate drought or that mature before the periods of dry weather helps to overcome the limited available water capacity. Seeding fewer plants per acre conserves moisture and increases the likelihood of seedling survival. Field windbreaks reduce the hazard of soil blowing.

In areas used for pasture, droughtiness, low fertility, and soil blowing are management concerns. Selecting drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands. Fertilizer should be applied frequently and in small amounts. This method of application minimizes the loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control soil blowing.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Erosion is a hazard during construction periods. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Subsurface tile drains help to lower the water table. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

151A—Ridgeville fine sandy loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains and stream terraces. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil is black, very friable fine sandy loam about 16 inches thick. The subsoil is about 33 inches thick. In sequence downward, it is dark brown, mottled, very friable fine sandy loam; brown,

mottled, very friable fine sandy loam; grayish brown, mottled, very friable fine sandy loam; and grayish brown, mottled, loose loamy fine sand. The underlying material to a depth of 60 inches or more is grayish brown, loose loamy fine sand. In some areas the subsoil contains more clay. In other areas the surface layer is thinner.

Included with this soil in mapping are small areas of the poorly drained Selma soils. These soils are in depressions and in the lower positions on the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Ridgeville soil at a moderate rate and through the underlying material at a moderately rapid rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is low. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, soil blowing is a hazard and the moderate available water capacity is a limitation. Crop yields are significantly reduced during periods of low rainfall. The seasonal high water table delays planting in the spring. Surface ditches and subsurface drains help to remove excess water. A conservation tillage system that leaves crop residue on the surface after planting reduces the hazard of soil blowing, conserves moisture, and improves fertility. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. Seeding fewer plants per acre conserves moisture and increases the likelihood of seedling survival. Field windbreaks reduce the hazard of soil blowing. This soil is suited to irrigation, and a source of water is generally available.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIs.

152—Drummer silty clay loam. This nearly level, poorly drained soil is on broad flats and in shallow depressions and drainageways on till plains and outwash plains. The shallow depressions are ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 500 acres in size.

Typically, the surface soil is black, friable silty clay loam about 14 inches thick. The subsoil is about 36 inches thick. The upper part is dark gray and dark grayish brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, friable silty clay loam. The lower part is grayish brown, mottled, friable, stratified silt loam and loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, stratified silt loam and loam. In some areas the depth to carbonates is less than 40 inches. In places the underlying material contains less sand.

Included with this soil in mapping are small areas of Peotone soils. These soils are in the deeper depressions and are ponded for longer periods in the spring than the Drummer soil. They make up 2 to 5 percent of the unit.

Water and air move through the Drummer soil at a moderate rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is very high. Organic matter is high. The shrink-swell potential is moderate. The potential for frost action is high. The surface layer can be easily tilled only within a narrow range in moisture content.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

153—Pella silty clay loam. This nearly level, poorly drained soil is in depressions on outwash plains and till plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface soil is black and very dark gray, friable silty clay loam about 14 inches thick. The

subsoil is about 30 inches thick. In sequence downward, it is grayish brown, mottled, friable silty clay loam; olive gray, mottled, friable, calcareous silty clay loam; light olive gray, mottled, friable, calcareous silt loam; and gray, mottled, friable, calcareous, stratified silt loam and fine sandy loam. The underlying material to a depth of 60 inches or more is gray, mottled, friable, calcareous, stratified fine sandy loam and silt loam. In places the depth to carbonates is greater. In some areas the surface layer contains snail shells and has a higher pH. In other areas the soil contains more sand throughout. In some places the surface layer contains less clay.

Included with this soil in mapping are small areas of Peotone soils. These soils are in the deeper depressions and are ponded for longer periods in the spring than the Pella soil. They make up 2 to 5 percent of the unit.

Water and air move through the Pella soil at a moderate rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is high. Organic matter content also is high. The surface layer is friable but becomes hard and cloddy if tilled when it is wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting in some years. The high content of lime in the subsoil reduces the availability of applied phosphorus and potassium and other plant nutrients. Applying fertilizer at a rate that is higher than normal helps to overcome this limitation. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum improves tilth and fertility, minimizes crusting, and increases the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

189A—Martinton silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on lake plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 12 inches thick. The subsoil is about 34 inches thick. In sequence downward, it is dark brown, friable silty clay loam; dark grayish brown, mottled, firm silty clay; grayish brown, mottled, firm silty clay loam; and grayish brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is grayish brown and yellowish brown, very friable, calcareous, stratified silty clay loam and sandy loam. In places the subsoil is thicker. In a few areas the subsoil has more clay. In some places the surface layer contains less organic matter or more clay.

Included with this soil in mapping are small areas of Milford soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Martinton soil at a moderately slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Erosion is a hazard in areas where slopes are very long. The seasonal high water table can be lowered by surface ditches or subsurface drains. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, increase the rate of water infiltration, and reduce the hazard of erosion.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the slow permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

189B—Martinton silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on side slopes and ridges on lake plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsoil is about 30 inches thick. In sequence downward, it is dark brown, mottled, friable silty clay loam; brown, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and light olive brown, mottled, friable, calcareous, stratified silty clay loam and silt loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, stratified silt loam and silty clay loam. In places the surface layer contains more clay. In some areas the subsoil is thicker. In other areas the surface soil is thinner and has been mixed with the subsoil. In a few places the subsoil has more clay.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Martinton soil at a moderately slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these reduces the hazard of erosion, minimizes crusting, and increases the rate of water infiltration. Subsurface drains can lower the seasonal high water table if suitable outlets are available.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

192A—Del Rey silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on lake plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 7 inches thick. The subsoil is about 30 inches thick. The upper part is dark yellowish brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, firm silty clay. The lower part is grayish brown, mottled, firm silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm, stratified silty clay loam and sandy loam. In some places the subsoil is thinner. In other places the surface layer contains more organic matter or more clay. In a few areas the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Del Rey soil at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to timber production and to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Erosion is a hazard in areas where slopes are very long. The seasonal high water table can be lowered by surface ditches or subsurface drains. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, increase the rate of water infiltration, and reduce the hazard of erosion.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by

removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used for timber production, seedling mortality and windthrow are management concerns because of the high clay content of the soil. Seedling mortality can be controlled by planting species that can tolerate excessive moisture conditions. Harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the stand. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

206—Thorp silt loam. This nearly level, poorly drained soil is in slight depressions on stream terraces, outwash plains, and till plains. It is frequently ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsurface layer is light gray, mottled, friable silt loam about 4 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is gray, friable silty clay loam. The next part is light gray, friable silty clay loam. The lower part is light gray, friable sandy clay loam. The underlying material to a depth of 60 inches or more is light gray, friable, stratified sandy loam and silty clay loam. In some places the subsoil contains more sand.

Water and air move through the upper part of the Thorp soil at a slow rate and through the underlying material at a moderately rapid rate. Surface runoff is very slow or ponded in cultivated areas. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and hay. It is moderately suited to pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting, damage crops, and reduce productivity. Surface inlets or standpipes and subsurface tile are commonly needed to remove excess water from closed depressions. Surface ditches also help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

223B2—Varna silty clay loam, 2 to 4 percent slopes, eroded. This gently sloping, moderately well drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 30 inches thick. In sequence downward, it is dark yellowish brown, friable silty clay loam; dark brown, mottled, friable silty clay loam; light olive brown, mottled, firm silty clay loam; and grayish brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous silty clay loam. In places the surface layer contains more sand and less clay. In some areas the subsoil contains more sand. In other areas the surface soil is thinner and lighter in color. In a few places the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Ashkum and somewhat poorly drained Elliott soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Elliott soils are in landscape positions similar to those of the Varna soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Varna soil at a moderately slow rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 6 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a concern. A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

223C2—Varna silty clay loam, 4 to 9 percent slopes, eroded. This sloping, moderately well drained soil is on short, uneven side slopes on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 26 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is grayish brown, mottled, firm silty clay loam. The lower part is grayish brown, mottled, very firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous silty clay loam. In places the surface layer contains more sand and less clay. In some areas the subsoil is thinner. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ashkum and somewhat poorly drained Elliott soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Elliott soils are in landscape positions similar to those of the Varna soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Varna soil at a moderately slow rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 6 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is moderately suited to dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and poor tilth is a concern. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil losses within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth, minimize surface

crusting, and increase the rate of water infiltration.

Adapted forage and hay plants grow well on this soil, but erosion is a hazard, particularly when the plants are being established. Timely deferment of grazing helps to prevent overgrazing and thus minimizes surface compaction, reduces the runoff rate, and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

228A—Nappanee silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises and broad ridges on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is dark grayish brown, mottled, friable silt loam about 5 inches thick. The subsoil is firm silty clay about 20 inches thick. It is mottled. The upper part is dark grayish brown, and the lower part is grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous silty clay. In places the surface layer contains more sand and less silt. In some areas the subsoil is thinner. In a few places the soil is calcareous at the surface.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarence and poorly drained Rowe soils. Clarence soils are in landscape positions similar to those of the Nappanee soil. They have a darker surface layer than the Nappanee soil. Rowe soils are in the lower positions on the landscape and in drainageways. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Nappanee soil at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 2 feet in the spring. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to timber production and to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. The moderate available water capacity, poor tilth, and a restricted root zone are management concerns. Erosion is a hazard in areas where slopes are very long. Surface ditches help to lower the seasonal high water table. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. A conservation tillage system that leaves crop residue on the surface after planting helps to control erosion. An adequate liming program is needed to increase the naturally low pH in the upper part of the soil. Leaving crop residue on the surface conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used for timber production, seedling mortality, the windthrow hazard, and plant competition

are management concerns. Seedling mortality can be reduced by planting species that can tolerate excessive moisture conditions. Harvesting methods that do not leave the remaining trees isolated or widely spaced reduce the windthrow hazard. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the stand. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Grading and land shaping help to remove surface water. Subsurface tile drains help to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIw.

228B—Nappanee silt loam, 2 to 4 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 3 inches thick. The subsoil is about 29 inches thick. In sequence downward, it is light olive brown, mottled, firm silty clay loam; grayish brown, mottled, firm silty clay; grayish brown, mottled, firm, calcareous silty clay; and grayish brown, mottled, very firm, calcareous clay. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous clay. In places the surface layer contains more sand and less silt. In some areas glacial till is closer to the surface. In other areas the subsoil contains more sand. In cultivated areas the surface layer is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarence and poorly drained Rowe soils. Clarence soils are in landscape positions similar to those of the Nappanee soil. They have a darker surface layer than the Nappanee soil. Rowe soils are in the lower positions on the landscape and in drainageways. Included soils make up 2 to 15 percent of the unit.

Water and air move through the Nappanee soil at a very slow rate. Surface runoff is rapid. A seasonal high water table is at a depth of 1 to 2 feet in the spring. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for pasture or hay. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to timber production and to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table delays planting in some years. The moderate available water capacity, the moderately low organic matter content, poor tilth, and a restricted root zone are management concerns. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation dominated by forage crops help to control erosion. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. Leaving crop residue on the surface conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction. Surface ditches help to lower the seasonal high water table.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used for timber production, seedling mortality, the windthrow hazard, and plant competition are management concerns. Seedling mortality can be

reduced by planting species that can tolerate excessive moisture conditions. Harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the stand. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

228C—Nappanee silt loam, 4 to 9 percent slopes. This sloping, somewhat poorly drained soil is on side slopes on till plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is grayish brown silt loam about 6 inches thick. The subsoil is about 15 inches thick. The upper part is light olive brown, mottled, very firm silty clay. The next part is grayish brown, mottled, very firm silty clay. The lower part is grayish brown, mottled, very firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, very firm, calcareous clay. In places the subsoil is thicker. In a few areas the surface layer contains more sand and less silt. In some places the upper part of the subsoil contains less clay. In other places the subsoil contains more sand. In cultivated areas the surface layer is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the moderately well drained Chatsworth and poorly drained Rowe soils. Chatsworth soils are on the steeper parts of slopes. They have a thinner subsoil than the Nappanee soil. Rowe soils are in the lower positions on the landscape and in drainageways. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Nappanee soil at a very slow rate. Surface runoff is rapid. A seasonal high water table is at a depth of 1 to 2 feet in the spring. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for pasture and hay or as woodland. A few areas are used for cultivated crops. This soil is moderately suited to pasture and hay. It is poorly suited to cultivated crops, to timber production, and to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The moderate available water capacity, the moderately low organic matter content, poor tilth, and a restricted root zone are management concerns. The seasonal high water table delays planting in some years. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation dominated by forage crops help to control erosion. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. Leaving crop residue on the surface conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction. Surface ditches help to lower the seasonal high water table.

If this soil is used for timber production, seedling mortality, the windthrow hazard, and plant competition are management concerns. Seedling mortality can be reduced by planting species that can tolerate excessive moisture conditions. Harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the stand. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

If this soil is used as a site for dwellings with or

without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IVe.

229—Monee silt loam. This nearly level, poorly drained soil is on upland flats and in shallow depressions on till plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 7 inches thick. The subsoil is about 31 inches thick. The upper part is gray, mottled, firm silty clay loam. The lower part is gray, mottled, firm silty clay. The underlying material to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay. In some areas the depth to glacial till is greater. In a few places the surface layer is thicker or contains more clay.

Included with this soil in mapping are the somewhat poorly drained Nappanee and poorly drained Rowe soils. Nappanee soils are in the higher positions on the landscape. Rowe soils are in landscape positions similar to those of the Monee soil. They have a thicker surface layer than the Monee soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Monee soil at a very slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is high. The potential for frost action is moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting, damage crops, and reduce productivity. The moderate available water capacity, poor tilth, and a restricted root zone are management concerns. Surface ditches help to lower the seasonal high water table. Surface inlets or standpipes and subsurface tile are commonly needed to remove excess water from closed depressions. Measures that maintain or improve the drainage system are needed. Selecting short-season or drought-tolerant crop varieties minimizes the extent of crop damage caused by the limited available water capacity and the restricted root zone. A conservation tillage system that leaves crop residue on the surface after planting helps to control erosion. Leaving crop residue on the surface also conserves moisture. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

The land capability classification is IIIw.

230—Rowe silty clay. This nearly level, poorly drained soil is on upland flats and in shallow depressions on till plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 10 to 400 acres in size.

Typically, the surface layer is black, friable silty clay about 11 inches thick. The subsoil is about 34 inches thick. The upper part is dark grayish brown, mottled, friable silty clay. The next part is gray, mottled, firm silty clay. The lower part is gray, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more also is gray, mottled, firm, calcareous

silty clay. In some places the depth to glacial till is greater. In a few areas the surface layer is thicker or contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarence and Nappanee soils. These soils are in the higher positions on the landscape. Nappanee soils have less organic matter in the surface layer than the Rowe soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Rowe soil at a very slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential also is high. The potential for frost action is moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture. It is well suited to hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting, damage crops, and reduce productivity. Surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIIw.

232—Ashkum silty clay loam. This nearly level, poorly drained soil is on upland flats and in shallow depressions and drainageways on till plains. It is ponded for brief periods during the spring. Individual areas are irregular in shape and range from 3 to 600 acres in size.

Typically, the surface soil is black, friable silty clay loam about 20 inches thick. The subsoil is about 27 inches thick. The upper part is dark grayish brown, mottled, friable silty clay loam. The next part is dark grayish brown and gray, mottled, firm silty clay loam. The lower part is gray, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more also is gray, mottled, firm, calcareous silty clay loam. In places the surface layer contains more clay. In some areas the subsoil contains more sand. In other areas the subsoil contains more clay.

Included with this soil in mapping are small areas of Peotone soils. These soils are in the deeper depressions and are ponded for longer periods in the spring than the Ashkum soil. They make up 2 to 5 percent of the unit.

Water and air move through the subsoil of the Ashkum soil at a moderately slow rate and through the underlying material at a slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 1 foot above to 2 feet below the surface in the spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high. The surface layer can be easily tilled only within a narrow range in moisture content. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table, the ponding, and tilth are management concerns. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

235—Bryce silty clay. This nearly level, poorly drained soil is on upland flats and in shallow depressions on till plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 10 to 400 acres in size.

Typically, the surface layer is black, firm silty clay about 11 inches thick. The subsoil is about 37 inches thick. The upper part is dark grayish brown and grayish brown, mottled, firm silty clay. The next part is olive gray, mottled, firm silty clay. The lower part is olive gray, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is dark gray, mottled, firm, calcareous silty clay. In some places the subsoil is thinner. In a few places the surface layer is thicker or contains less clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Swygert and Nappanee soils. These soils are in the higher positions on the landscape. Nappanee soils contain less organic matter in the surface layer than the Bryce soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Bryce soil at a slow rate and through the underlying material at a very slow rate. Surface runoff is very slow

or ponded. A seasonal high water table is 1 foot above to 1 foot below the surface in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting, damage crops, and reduce productivity. Surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

238—Rantoul silty clay. This nearly level, very poorly drained soil is in shallow depressions on till plains. It is ponded for long periods in the spring. Individual areas are round or oblong and range from 3 to 20 acres in size.

Typically, the surface soil is black and very dark gray, firm silty clay about 17 inches thick. The subsoil is about 43 inches thick. The upper part is very dark gray, mottled, firm silty clay. The next part is dark gray and gray, mottled, firm silty clay. The lower part is gray and yellowish brown, mottled, very firm clay loam. In some areas the surface layer is thicker or contains less clay. In a few places the subsoil is thinner.

Water and air move through the Rantoul soil at a very slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential also is high. The potential for frost action is moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting, damage crops, and reduce productivity. Surface inlets or standpipes and subsurface tile are commonly needed to remove excess water from closed depressions. Surface ditches also help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

If this soil is used for pasture and hay, the ponding is a hazard. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface drains, ditches, and surface inlet tiles. Deferring grazing when the soil is too wet minimizes surface compaction and helps to maintain tilth. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The grain and seed crops, grasses, and wild herbaceous plants used as food and cover by openland wildlife grow well on this soil. Measures that protect the habitat from grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIIw.

241C—Chatsworth silty clay, 4 to 10 percent slopes. This sloping, moderately well drained soil is on short, uneven side slopes on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown, firm, calcareous silty clay about 8 inches thick. The subsoil is about 8 inches thick. It is grayish brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is olive gray and dark grayish brown, mottled, very firm and extremely firm, calcareous silty clay. In some places the surface layer is thicker, is darker, or contains less clay. In other places the subsoil is thicker. In some areas the seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarence soils, the moderately well drained Mona soils, and the poorly drained Rowe soils. Clarence and Mona soils are in the less sloping areas. Mona soils contain more sand in the subsoil than the Chatsworth soil. Rowe soils are in shallow depressions and drainageways. Also included are some areas where calcareous glacial till is exposed. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Chatsworth soil at a very slow rate. Surface runoff is rapid. Available water capacity is low. Organic matter content also is low. The shrink-swell potential and the potential for frost action

are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for pasture. This soil is generally unsuited to cultivated crops because of a high clay content, a high pH, and poor tilth. It is poorly suited to pasture and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps to control erosion. The plants should not be grazed until they are sufficiently established. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer minimize surface compaction and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Vegetation is difficult to establish where the glacial till is exposed. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

If this soil is used as a site for septic tank absorption fields, the restricted permeability is a severe limitation. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is VIe.

241D—Chatsworth silty clay, 10 to 20 percent slopes. This strongly sloping, moderately well drained soil is on short, uneven side slopes on till plains. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface soil is dark grayish brown, firm silty clay. The subsoil is about 16 inches thick. The upper part is dark grayish brown, mottled, firm silty clay. The next part is dark grayish brown, mottled, firm, calcareous silty clay. The lower part is grayish brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous silty clay. In places the depth to carbonates is greater. In a few areas the subsoil contains less clay. In some places the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarence and poorly drained Rowe soils. Clarence soils are in the less sloping areas. Rowe soils are in shallow depressions and drainageways. Also included are some areas where the calcareous glacial till is exposed. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Chatsworth soil at a very slow rate. Surface runoff is rapid. Available water capacity is low. Organic matter content also is low. The shrink-swell potential and the potential for frost action are moderate. After hard rains a crust commonly forms on the surface.

Most areas are used for pasture. This soil is generally unsuited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields and to openland wildlife habitat.

This soil can be used for the grain and seed crops and grasses and legumes grown as food and cover for openland wildlife. Examples of suitable grasses and legumes are bromegrass, orchardgrass, ladino clover, alsike clover, and red clover. Measures that protect the habitat from grazing are needed.

If this soil is used as a site for dwellings with or without basements, the slope is a severe limitation and the shrink-swell potential is a moderate limitation. Vegetation is difficult to establish where the glacial till is exposed. Erosion is a hazard during construction. Extensive land shaping by cutting and filling is needed. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the restricted permeability and the slope are severe limitations. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Placing filter lines on the contour helps to prevent the contamination of surface water and the seepage of effluent on side slopes. Onsite investigation is needed. The design of septic tank

absorption fields should meet local and State guidelines.

The land capability classification is VIIe.

293A—Andres loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on till plains. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is black, friable loam about 11 inches thick. The subsoil is about 39 inches thick. In sequence downward, it is dark brown, mottled, friable clay loam; grayish brown, mottled, friable clay loam; grayish brown, mottled, friable silty clay loam; and light olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more also is light olive brown, mottled, firm, calcareous silty clay loam. In places the surface layer contains less sand. In some areas the surface layer and the subsoil contain more sand. In other areas the underlying material contains more sand.

Included with this soil in mapping are small areas of the poorly drained Reddick and moderately well drained Symerton soils. Reddick soils are in the lower positions on the landscape and in drainageways. Symerton soils are in the more sloping, higher areas. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Andres soil at a moderate rate and through the lower part at a slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

294B—Symerton silt loam, 2 to 4 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 11 inches thick. The subsoil is about 24 inches thick. The upper part is brown, friable clay loam. The next part is yellowish brown, friable loam. The lower part is yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is light yellowish brown, mottled, firm, calcareous silt loam. In some places the subsoil contains more clay. In some areas the surface layer has been mixed with the upper part of the subsoil through tillage.

Included with this soil in mapping are small areas of the somewhat poorly drained Andres and poorly drained Reddick soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Symerton soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3.5 to 6.0 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of

foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

294B2—Symerton loam, 2 to 4 percent slopes, eroded. This gently sloping, moderately well drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. The subsoil is about 34 inches thick. In sequence downward, it is dark yellowish brown, friable clay loam; dark yellowish brown, mottled, friable silty clay loam; dark yellowish brown and brown, mottled, friable clay loam; and light olive brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam. In some places the depth to glacial till is greater. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of Andres and Reddick soils. The somewhat poorly drained Andres soils are in the less sloping, slightly lower positions on the landscape. The poorly drained Reddick soils are in depressions and drainageways. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Symerton soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3.5 to 6.0 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a concern. A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

294C2—Symerton silt loam, 4 to 9 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes on till plains. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsoil is about 32 inches thick. In sequence downward, it is dark brown, friable clay loam; dark brown, mottled, friable silty clay loam; dark brown, mottled, friable clay loam; light olive brown, mottled, friable, calcareous loam; and light olive brown, mottled, firm, calcareous silt loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silt loam. In some places the subsoil contains more clay. In a few places the water table is below a depth of 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Andres soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Symerton soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3.5 to 6.0 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential

and the potential for frost action also are moderate.

Most areas are used for pasture and hay. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these helps to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and minimize crusting.

Adapted forage and hay plants grow well on this soil, but erosion is a hazard, particularly when the plants are being established. Timely deferment of grazing helps to prevent overgrazing and thus minimizes surface compaction, reduces the runoff rate, and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Installing tile drains around the base of foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

295A—Mokena silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsoil is about 29 inches thick. In sequence downward, it is dark brown, mottled, friable silty clay loam; dark brown, mottled, friable clay loam; dark brown, mottled, friable sandy loam; dark grayish brown, mottled, friable sandy clay loam; and grayish brown, mottled, firm silty clay. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm, calcareous silty clay. In some places the subsoil is thinner. In a few places the surface layer and the subsoil have more clay.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Mokena soil at a moderately slow rate and through the underlying material at a very slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted

permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Grading and land shaping help to remove surface water. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

300—Westland clay loam. This nearly level, poorly drained soil is in broad, nearly level areas and depressions on gravel terraces. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 300 acres in size.

Typically, the surface soil is black and very dark gray, friable clay loam about 17 inches thick. The subsoil is about 32 inches thick. The upper part is dark grayish brown, mottled, friable clay loam. The lower part is dark grayish brown, mottled, friable, calcareous gravelly clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, loose, calcareous gravelly sand. In places the underlying material contains more clay. In some areas the underlying material contains more sand and less gravel. In other areas sand and gravel are at a depth of less than 40 inches.

Included with this soil in mapping are small areas of Peotone soils in depressions. These soils are fine textured and have a thicker surface layer than the Westland soil. Also, they do not contain sand and gravel. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Westland soil at a moderate rate and through the underlying material at a very rapid rate. Surface runoff is very slow or ponded in cultivated areas. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting in some years. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction.

The land capability classification is IIw.

330—Peotone silty clay loam. This nearly level and depressional, very poorly drained soil is in shallow depressions on till plains. It is ponded for long periods in the spring. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is black, friable silty clay loam about 18 inches thick. The subsurface layer is black, firm silty clay about 11 inches thick. The subsoil is about 31 inches thick. The upper part is dark gray, mottled, firm silty clay. The lower part is olive gray and gray, mottled, firm, calcareous silty clay. In places the surface soil is thinner. In some areas the soil has more sand in the lower part. In other areas the soil has less clay in the solum.

Water and air move through this soil at a moderately slow rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high. The surface layer can be easily tilled only within a narrow range in moisture content. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and moderately suited to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting, damage crops, and reduce productivity. Surface inlets or standpipes and subsurface tile are commonly needed to remove excess water from closed depressions. Surface ditches also help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

If this soil is used for pasture and hay, the ponding is a hazard. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface drains, ditches, and surface inlet tiles. Deferring grazing when the soil is too wet minimizes surface compaction and helps to maintain tilth. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The grain and seed crops, grasses, and wild herbaceous plants used as food and cover by openland wildlife grow well on this soil. Measures that protect the habitat from grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIw.

375A—Rutland silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises and ridges on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface soil is black, friable silty clay loam about 15 inches thick. The subsoil is about 31 inches thick. In sequence downward, it is brown, mottled, friable silty clay; dark brown, mottled, friable silty clay loam; grayish brown, mottled, friable silty clay loam; and light olive brown and gray, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more also is light olive brown and gray, firm, calcareous silty clay. In some places the surface layer and the subsoil contain less clay. In a few areas the subsoil has more sand. In places the subsoil is thinner.

Included with this soil in mapping are small areas of the poorly drained Streator soils. These soils are in the lower positions on the landscape and in drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Rutland soil at a moderately slow rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Erosion is a hazard in areas where slopes are very long. The seasonal high water table can be lowered by surface ditches or subsurface drains. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, increase the rate of water infiltration, and reduce the hazard of erosion.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table and the shrink-swell potential are severe limitations. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Grading and land shaping help to remove surface water. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

375B—Rutland silty clay loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface soil is black, friable silty clay loam about 13 inches thick. The subsoil is about 37 inches thick. The upper part is dark brown, mottled, friable silty clay. The next part is grayish brown, mottled, friable silty clay loam. The lower part is grayish brown, very firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light olive brown and gray, firm, calcareous silty clay. In places the surface layer contains less clay. In some areas the subsoil is thinner. In other areas the surface layer has been mixed with the upper part of the subsoil by tillage. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Streator soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Rutland soil at a moderately slow rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table

delays planting in some years. Contour farming, terraces, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration. Subsurface drains can lower the seasonal high water table if suitable outlets are available.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table and the shrink-swell potential are severe limitations. Installing tile drains near foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept water and reduces wetness. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

398A—Wea loam, 0 to 2 percent slopes. This nearly level, well drained soil is on slight rises on gravel terraces. Individual areas are irregular in shape and range from 3 to 300 acres in size.

Typically, the surface soil is very dark grayish brown, friable loam about 12 inches thick. The subsoil is about 42 inches thick. The upper part is brown and dark yellowish brown, friable clay loam. The next part is dark yellowish brown, friable sandy clay loam, sandy loam, and gravelly sandy clay loam. The lower part is dark brown, friable gravelly clay loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose, calcareous gravelly sand. In places the surface layer contains more silt and less sand. In some areas the upper part of the subsoil contains less sand. In other areas the surface layer is thinner and lighter in color. In some places the lower part of the subsoil and the underlying material contain less gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Crane and poorly drained Westland soils. These soils are in the lower positions on the landscape. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Wea soil at a moderate rate and through the underlying material at a very rapid rate. Surface runoff is slow. Available water capacity is high. Organic matter content also is high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings. No major limitations affect the use of this soil as a site for septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

No major limitations affect the use of this soil as a site for septic tank absorption fields. Because the soil is underlain by sand and gravel at a depth of more than 40 inches, however, filter lines should be placed above this depth. The sandy and gravelly material readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

398B—Wea loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes on gravel terraces. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil is very dark brown, friable loam about 14 inches thick. The subsoil is about 30 inches thick. The upper part is brown, friable loam. The

next part is dark yellowish brown, mottled, friable clay loam. The lower part is brown, mottled, friable gravelly clay loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable, calcareous gravelly clay loam. In some places the surface layer contains more silt and less sand. In other places the surface layer is thinner and has been mixed with the subsoil. In a few areas the upper part of the subsoil has less sand. In other areas the lower part of the subsoil and the underlying material contain more gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Crane and poorly drained Westland soils. Crane soils are in the nearly level, slightly lower positions on the landscape. Westland soils are in the lower positions on the landscape and in drainageways. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Wea soil at a moderate rate and through the underlying material at a very rapid rate. Surface runoff is medium. Available water capacity is high. Organic matter content also is high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings. No major limitations affect the use of this soil as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

No major limitations affect the use of this soil as a site for septic tank absorption fields; however, the soil is underlain by sand and gravel below a depth of 40 inches. Filter field lines should be placed above this depth. The sandy and gravelly material readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

435—Streator silty clay loam. This nearly level, poorly drained soil is on upland flats and in shallow depressions on till plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 10 to 100 acres in size.

Typically, the surface layer is black and very dark gray silty clay loam about 16 inches thick. The subsoil is about 35 inches thick. The upper part is dark gray and olive gray, mottled, firm and very firm silty clay loam. The lower part is olive gray, mottled, very firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is gray, mottled, very firm, calcareous silty clay. In places the subsoil is thinner. In a few areas the surface layer is thicker or contains more clay.

Included with this soil in mapping are small areas of Rantoul soils and the somewhat poorly drained Rutland soils. Rantoul soils are in depressions and are ponded for longer periods in the spring than the Streator soil. Rutland soils are in the higher positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Streator soil at a moderately slow rate and through the underlying material at a slow rate. Surface runoff is slow to ponded. A seasonal high water table is at the surface to 2 feet below the surface in the spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting, damage crops, and reduce productivity. Surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff.

The land capability classification is IIw.

440A—Jasper loam, 0 to 2 percent slopes. This nearly level, well drained soil is on slight rises on outwash plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface soil is very dark gray, friable loam about 11 inches thick. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable clay loam. The next part is dark yellowish brown,

mottled, friable clay loam and sandy clay loam. The lower part is brown, mottled, friable sandy loam. The upper part of the underlying material is dark grayish brown, very friable sandy loam. The lower part to a depth of 60 inches or more is yellowish brown and gray, loose, calcareous sand. In places the surface layer contains more silt or more sand. In some areas the subsoil is thicker. In a few places the underlying material contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils. These soils are in drainageways and in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. Surface runoff is slow. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is well suited to dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

No major limitations affect the use of this soil as a site for septic tank absorption fields. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

440B—Jasper loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on side slopes and ridges on outwash plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil is very dark brown, friable loam about 11 inches thick. The subsoil is about 37 inches thick. The upper part is brown, friable clay loam. The next part is dark yellowish brown, friable clay loam and sandy loam. The lower part is dark brown, very friable sandy loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose loamy sand. In some places the surface soil is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils. These soils are in the less sloping, slightly lower positions and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, pasture, and hay. It is well suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

No major limitations affect the use of this soil as a site for septic tank absorption fields. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

440C2—Jasper loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on side slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is very dark gray, friable loam about 6 inches thick. The subsoil is about 39 inches thick. The upper part is dark yellowish brown, friable clay loam. The next part also is dark yellowish brown, friable clay loam. The lower part is dark yellowish brown, friable sandy loam. The underlying material to a depth of 60 inches or more is dark yellowish brown and dark brown, friable, stratified sandy loam and loamy sand. In places the subsoil is thicker. In a few areas the underlying material contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils. These soils are in the less sloping, slightly lower positions and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is well suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these helps to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding

other organic material help to maintain productivity and tilth and minimize crusting.

Adapted forage and hay plants grow well on this soil, but erosion is a hazard, particularly when the plants are being established. Timely deferment of grazing helps to prevent overgrazing and thus minimizes surface compaction, reduces the runoff rate, and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

No major limitations affect the use of this soil as a site for septic tank absorption fields. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

443B—Barrington silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on lake plains. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 31 inches thick. In sequence downward, it is dark brown, friable silty clay loam; dark yellowish brown and yellowish brown, friable silty clay loam; yellowish brown, mottled, friable silty clay loam; and yellowish brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, friable, calcareous silt loam and fine sandy loam. In places the subsoil is thinner. In a few areas the subsoil contains more sand. In other areas the surface layer is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the somewhat poorly drained Harco and poorly drained Patton soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the Barrington soil at a moderate rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 6 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is low. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is well suited to dwellings without basements and moderately suited to dwellings with basements. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

The seasonal high water table is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

448B2—Mona silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable clay loam. The next part is dark yellowish brown, mottled, friable clay loam. The lower part is light olive brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay. In places the surface layer contains more sand, more clay, or both. In some areas the depth to glacial till is greater. In a few places the subsoil has less sand.

Included with this soil in mapping are small areas of the poorly drained Bryce and somewhat poorly drained Mokena soils. Bryce soils are fine textured. They are in the lower positions on the landscape and in drainageways. Mokena soils are in the slightly lower positions on the landscape. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Mona soil at a moderately slow rate and through the underlying material at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 2.5 to 4.0 feet in the spring. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is

well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a concern. A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion. Incorporating crop residue into the soil or adding other organic material minimizes crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and minimizes surface compaction.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in reducing the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition, minimize surface compaction, and reduce the runoff rate.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations or installing interceptor drains on the side slopes at a level above the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

448C2—Mona silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on short, uneven side slopes on till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface soil is very dark brown, friable silt loam about 7 inches thick. The subsoil is about 30 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, friable clay loam. The lower part is light olive brown, mottled, firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silty clay. In places the depth to glacial till is greater. In a few areas the subsoil has less sand.

Included with this soil in mapping are small areas of the poorly drained Bryce and somewhat poorly drained Mokena soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Mona soil at a moderately slow rate and through the underlying material at a very slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 2.5 to 4.0 feet in the spring. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

Adapted forage and hay plants grow well on this soil, but erosion is a hazard, particularly when the plants are being established. Timely deferment of grazing helps to prevent overgrazing and thus minimizes surface compaction, reduces the runoff rate, and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes

construction problems, and reduces the hazard of erosion.

The seasonal high water table and the restricted permeability are severe limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

484—Harco silty clay loam. This nearly level, somewhat poorly drained soil is on slight rises on lake plains. Individual areas are irregular in shape and range from 3 to 300 acres in size.

Typically, the surface soil is black, friable silty clay loam about 13 inches thick. The subsoil is about 22 inches thick. The upper part is very dark gray, friable silty clay loam. The next part is yellowish brown, mottled, friable silty clay loam. The lower part is yellowish brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, mottled, friable, calcareous silt loam. In places the depth to lacustrine sediments is greater. In a few places the subsoil contains less clay. In some areas the underlying material is glacial till.

Included with this soil in mapping are small areas of the poorly drained Patton soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the Harco soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

The seasonal high water table is a severe limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

503A—Rockton silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on slight rises on hills. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsoil is about 24 inches thick. The upper part is dark brown, friable silt loam. The lower part is dark yellowish brown and brown, friable clay loam. The underlying material to a depth of 60 inches or more is white bedrock. In some places the depth to bedrock is more than 40 inches. In other places the subsoil contains less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils. These soils are underlain by glacial outwash. They are in the slightly lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the Rockton soil at a moderate rate. Surface runoff is slow. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is moderately well suited to pasture and hay. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The depth to bedrock also is a moderate limitation on sites for dwellings with basements. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse

textured material help to prevent the structural damage caused by shrinking and swelling. The limestone bedrock at a depth of 40 to 60 inches is rippable and can be removed with a backhoe.

If this soil is used as a site for septic tank absorption fields, the shallow depth to bedrock is a severe limitation. Pollution of shallow aquifers is possible because of cracks and crevices in the bedrock. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIs.

536—Dumps, mine. This map unit consists of nearly level to very steep accumulations of refuse derived from the washing and separation of coal. Individual areas are irregularly shaped or fan shaped and range from 7 to 150 acres in size.

The material in the dumps consists of shale and siltstone fragments, sandstone cobbles, coal fragments, and loamy or clayey material from the cast overburden. The soil material is clay, silty clay, silty clay loam, clay loam, silt loam, or the shaly analogs of these textures. It is dominantly red and gray. The material and the included areas of water are very strongly acid or extremely acid. The gray material is more acid than the reddish material.

Included in mapping are dumps that contain gypsum produced by fertilizer processing plants. Also included are escarpments near areas of water and near the edge of mapped areas, where the unit is adjacent to natural soils. Included areas make up less than 20 percent of the unit.

Surface runoff is ponded or ranges from slow to very rapid. The runoff is toxic to most plants because of extreme acidity. The material is compact and can easily become eroded. The nearly level areas are wet. Depth to the water table has not been determined. The material contains practically no organic matter.

All of the acreage of this unit is idle land. The unit supports virtually no vegetation, except for cottonwood, bristly locust, and boxelder, which grow exclusively in small areas where the material is reddish.

Some areas of this unit have potential for recreational uses, such as shooting ranges, paths and trails, and other low-intensity uses. The major concerns are wetness in the nearly level areas and erosion and toxic runoff in the more sloping areas. The toxic runoff can be kept from entering drainageways and areas of deep water and from running onto cropland by constructing holding ponds. Reclamation of this unit would involve grading, shaping, and covering the areas with enough natural soil material to support vegetation. The feasibility and extent of reclamation depend on the conditions determined by onsite investigation and on the intended use.

No land capability classification is assigned.

539B—Wenona silt loam, loamy substratum, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on lake plains and till plains. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 13 inches thick. The subsoil is about 37 inches thick. In sequence downward, it is dark brown, friable silt loam; dark yellowish brown, friable silty clay loam; dark yellowish brown, mottled, friable silty clay loam; and brown, mottled, friable silty clay loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable, stratified silt loam. In some places the subsoil contains more sand. In other places the subsoil contains less clay. In some areas the surface layer is thinner, contains more clay, and has been mixed with the upper part of the subsoil through tillage.

Included with this soil in mapping are small areas of the poorly drained Bryce and somewhat poorly drained Swygert soils. These soils contain more clay in the underlying material than the Wenona soil. Bryce soils are in the lower positions on the landscape. Swygert soils are in landscape positions similar to those of the Wenona soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Wenona soil at a moderately slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 5 feet in the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential also is high. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion. Incorporating crop residue into the soil or adding other organic material minimize crusting and improve tilth. A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a severe limitation. The seasonal high water table is a

moderate limitation on sites for dwellings with basements. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Installing tile drains around the base of the foundations helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

539C2—Wenona silt loam, loamy substratum, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on short, uneven side slopes on lake plains and till plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsoil is about 37 inches thick. In sequence downward, it is dark brown, friable silty clay loam; brown, mottled, friable silty clay loam; light olive brown, mottled, friable, calcareous silty clay loam; and light olive brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more also is light olive brown, mottled, friable, calcareous silt loam. In places the surface layer contains more clay. In some areas the subsoil contains more sand. In other areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Bryce and somewhat poorly drained Swygert soils. These soils are underlain by silty clay glacial till. Bryce soils are in the lower positions on the landscape. Swygert soils are in landscape positions similar to those of the Wenona soil. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Wenona soil at a moderately slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 3 to 5 feet in the spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these helps to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and minimize crusting.

Adapted forage and hay plants grow well on this soil, but erosion is a hazard, particularly during the period when the plants are being established. Timely deferment of grazing helps to prevent overgrazing and thus minimizes compaction, reduces the runoff rate, and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a severe limitation. The seasonal high water table is a moderate limitation on sites for dwellings with basements. Reinforcing foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Installing tile drains around the base of the foundations helps to lower the seasonal high water table. Erosion is a hazard during construction. Soil loss and sedimentation can be minimized by removing plant cover only from sites currently under construction. Topsoil can be stockpiled and returned to the site after construction has been completed. Disturbed areas should be seeded or sodded as soon as possible. Building on the contour results in a more appealing location, minimizes construction problems, and reduces the hazard of erosion.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

541B—Graymont silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface soil is black and very dark

brown, friable silt loam about 12 inches thick. The subsoil is about 26 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is yellowish brown and brown, mottled, friable silty clay loam and silt loam. The lower part is grayish brown, mottled, firm silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown, firm, calcareous silty clay loam. In some places the glacial till is closer to the surface. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ashkum and somewhat poorly drained Chenoa soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Graymont soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 4 to 6 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table also is a moderate limitation on sites for dwellings with basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a moderate limitation and the restricted permeability is a severe limitation. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

542—Rooks silty clay loam. This nearly level, somewhat poorly drained soil is on slight rises on till plains. Individual areas are irregular in shape and range from 3 to 300 acres in size.

Typically, the surface soil is black and very dark gray, friable silty clay loam about 18 inches thick. The subsoil is about 36 inches thick. The upper part is dark brown and grayish brown, mottled, friable silty clay loam. The next part is grayish brown, gray, and yellowish brown, mottled, friable, calcareous silt loam and silty clay loam. The lower part is grayish brown and light olive brown, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown and light olive brown, mottled, firm, calcareous silty clay loam. In some places the glacial till is closer to the surface. In a few areas the subsoil contains more clay.

Included with this soil in mapping are small areas of the poorly drained Ashkum and Patton soils. These soils are in the lower positions on the landscape. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Rooks soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land

shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is I.

560E—St. Clair silty clay loam, 12 to 20 percent slopes. This moderately steep, moderately well drained soil is on short, uneven side slopes on till plains in areas adjacent to flood plains. Individual areas are long and narrow and range from 3 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 21 inches thick. The upper part is dark brown, very firm silty clay. The next part is dark brown, mottled, very firm, calcareous silty clay. The lower part is grayish brown, mottled, very firm, calcareous silty clay. The underlying material to a depth of 60 inches or more is grayish brown and light olive brown, mottled, very firm, calcareous clay. In some areas the surface layer is thicker or contains less clay. In other areas the subsoil is thinner. In a few places the seasonal high water table is below a depth of 6 feet. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the well drained Hennepin soils. These soils contain less clay in the subsoil than the St. Clair soil. They are in landscape positions similar to those of the St. Clair soil. They make up 5 to 10 percent of the unit.

Water and air move through the St. Clair soil at a very slow rate. Surface runoff is rapid. The seasonal high water table is at a depth of 2 to 3 feet. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are used for recreation, timber production, or wildlife habitat. This soil is generally unsuited to cultivated crops and is poorly suited to pasture and hay. It is moderately suited to timber production. It is generally unsuited to dwellings and septic tank absorption fields because of the slope, wetness, the shrink-swell potential, and the restricted permeability.

In areas used for timber production, the hazard of erosion and an equipment limitation are management concerns because of the slope. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

In wooded areas, this soil provides habitat for deer, squirrels, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and the hazard of erosion.

The land capability classification is VIe.

560F—St. Clair silty clay loam, 20 to 35 percent slopes. This steep, moderately well drained soil is on short, uneven side slopes on till plains in areas adjacent to flood plains. Individual areas are long and narrow and range from 3 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 21 inches thick. The upper part is dark brown, very firm silty clay. The next part is dark brown, mottled, very firm clay. The lower part is brown, mottled, very firm, calcareous clay. The underlying material to a depth of 60 inches or more is brown, mottled, very firm, calcareous clay. In some areas the surface layer is thicker or contains less clay. In other areas the subsoil is thinner. In a few places the seasonal high water table is below a depth of 6 feet. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the well drained Hennepin soils. These soils have less clay in the subsoil than the St. Clair soil. They are in landscape positions similar to those of the St. Clair soil. They make up 5 to 10 percent of the unit.

Water and air move through the St. Clair soil at a very slow rate. Surface runoff is rapid. A seasonal high water table is at a depth of 2 to 3 feet. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are used for recreation, timber production, or wildlife habitat. This soil is generally unsuited to cultivated crops and to pasture and hay. It is moderately suited to timber production. It is generally unsuited to dwellings and septic tank absorption fields because of the slope, wetness, the shrink-swell potential, and the restricted permeability.

In areas used for timber production, the hazard of erosion and an equipment limitation are management concerns because of the slope. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm

enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

In wooded areas, this soil provides habitat for deer, squirrels, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and the hazard of erosion.

The land capability classification is VIIe.

571A—Whitaker loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains and stream terraces. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 9 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil is about 31 inches thick. The upper part is dark brown, mottled, friable clay loam. The lower part is grayish brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, loose loamy sand. In places the surface layer contains more silt and less sand. In some areas the subsoil is thicker. In a few places the subsoil has more clay.

Included with this soil in mapping are small areas of the poorly drained Selma and moderately well drained Tuscola soils. Selma soils have a darker surface layer than the Whitaker soil. They are in the lower positions on the landscape. Tuscola soils are in the higher positions. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Whitaker soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are used for cultivated crops or for pasture and hay. Some areas support native woodland. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to timber production. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. An adequate liming program is needed to increase the naturally low pH in the upper part of the soil. The seasonal high water table can be lowered by surface ditches or subsurface drains. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used for pasture and hay, wetness-tolerant legumes and grasses should be selected. Winterkill and frost heave can be minimized by removing excess water with surface ditches and subsurface drains. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and reduce the hazard of erosion (fig. 9).

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

573B—Tuscola loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and side slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is brown, friable loam about 6 inches thick. The subsurface layer also is brown, friable loam. It is about 5 inches thick. The subsoil is about 39 inches thick. The upper part is dark brown and dark yellowish brown, friable clay loam. The next part is dark brown and strong brown, mottled, friable sandy clay loam. The lower part is grayish brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is brown,

Figure 9.—Pasture in an area of Whitaker loam, 0 to 2 percent slopes.

mottled, friable, stratified sandy loam and loamy sand. In some places the surface layer contains more silt and less sand. In other places the surface layer is thinner and has been mixed with the upper part of the subsoil through tillage. In some areas the underlying material is calcareous glacial till. In other areas the subsoil contains less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Whitaker soils. These soils are in the more nearly level areas and in drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Tuscola soil at a moderate rate. Surface runoff is medium. A seasonal high water table is at a depth of 2.0 to 3.5 feet in the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to timber production and to dwellings without basements. It is poorly suited to dwellings with basements and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these helps to control erosion. Returning crop residue to the soil and adding other organic material improve tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and reduce the hazard of erosion.

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table is a severe limitation on sites for dwellings with basements and a moderate limitation on sites for dwellings without basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

573C2—Tuscola loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 6 inches thick. The subsoil is about 37 inches thick. The upper part is brown, friable clay loam. The next part is dark yellowish brown, mottled, friable clay loam. The lower part is dark yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, friable, calcareous loam. In some places the underlying material is calcareous glacial till. In other places the subsoil contains less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Whitaker soils. These soils are in the more nearly level areas and in drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Tuscola soil at a moderate rate. Surface runoff is medium. A seasonal high water table is at a depth of 2.0 to 3.5 feet in the spring. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is moderately suited to timber production and to dwellings without basements. It is poorly suited to dwellings with basements and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these helps to control erosion. An adequate liming program is needed to increase the naturally low pH in the upper part of the soil. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and minimize crusting.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and reduce the hazard of erosion.

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with or without basements, the shrink-swell potential is a moderate limitation. The seasonal high water table is a severe limitation on sites for dwellings with basements and a moderate limitation on sites for dwellings without basements. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe

limitation. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIIe.

594—Reddick clay loam. This nearly level, poorly drained soil is on upland flats and in shallow depressions and drainageways on till plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 600 acres in size.

Typically, the surface layer is black, friable clay loam about 11 inches thick. The subsoil is about 41 inches thick. In sequence downward, it is dark grayish brown, mottled, friable clay loam; grayish brown, mottled, friable clay loam; gray, mottled, friable clay loam; and gray, mottled, firm, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay loam. In places the surface layer contains less sand or clay. In some areas the subsoil contains less sand. In other areas the underlying material contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Andres and moderately well drained Symerton soils. Andres soils are in the slightly higher positions on the landscape. Symerton soils are in the more sloping areas. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Reddick soil at a moderate rate and through the lower part at a slow rate. Surface runoff is very slow or ponded in cultivated areas. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table and the ponding can delay planting in some years. Subsurface drains and surface ditches help to remove excess water. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate.

The land capability classification is IIw.

609—Crane loam. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains and gravel terraces. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface soil is black, friable loam about 11 inches thick. The subsoil is about 44 inches thick. In sequence downward, it is dark grayish brown and brown, mottled, friable clay loam; brown, mottled, friable loam; grayish brown and gray, mottled, friable gravelly sandy loam; and yellowish brown, mottled, friable, calcareous gravelly sandy loam. The underlying material to a depth of 60 inches or more is brown, loose, calcareous very gravelly loamy coarse sand. In places the surface soil contains more silt and less sand.

Water and air move through the subsoil at a moderate rate and through the underlying material at a very rapid rate. Surface runoff is very slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is low. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. The soil is underlain by sand and gravel at a depth of more than 40 inches. Filter field lines should be placed above this depth. The sandy and gravelly material readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

614A—Chenoa silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises and broad ridges on till plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is black, friable silty clay loam about 12 inches thick. The subsoil is about 24 inches thick. The upper part is brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, friable silty clay loam. The lower part is light olive brown, mottled, firm silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam. In places the surface layer contains less clay. In some areas the subsoil is thinner. In other areas the subsoil contains less clay. In some places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in the lower positions on the landscape and in drainageways. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Chenoa soil at a moderate rate and through the lower part at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains higher on the side slopes than the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

614B—Chenoa silty clay loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on slight rises, ridges, and side slopes on till plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsoil is about 37 inches thick. In sequence downward, it is dark brown, friable silty clay loam; dark brown, mottled, friable silty clay loam; brown, mottled, friable silty clay loam; and light olive brown, mottled, friable, calcareous silty clay loam. The underlying material to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam. In places the subsoil is thinner. In a few areas the surface layer and the subsoil contain less clay. In other areas the subsoil contains more sand. In some places the surface soil is thinner and has been mixed with the subsoil through tillage.

Included with this soil in mapping are small areas of the poorly drained Ashkum and moderately well drained Graymont soils. Ashkum soils are in the lower positions on the landscape and in drainageways. Graymont soils are on side slopes next to drainageways. Included soils make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Chenoa soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. The seasonal high water table delays planting in some years. Contour farming, a conservation tillage system that leaves crop residue on the surface after planting, terraces, or a combination of these helps to control erosion, minimizes crusting, and increases the rate of water infiltration. The seasonal high water table can be lowered with subsurface drains if suitable outlets are available.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a

severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains near foundations or installing interceptor drains higher on the side slopes than the building helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are severe limitations. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material improves the absorption of liquid waste. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIe.

740—Darroch silt loam. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains. Individual areas are irregular in shape and range from 3 to 75 acres in size.

Typically, the surface soil is black, friable silt loam and silty clay loam about 16 inches thick. The subsoil is about 23 inches thick. The upper part is dark grayish brown and yellowish brown, mottled, friable clay loam. The lower part is light brownish gray and yellowish brown, friable loam. The underlying material to a depth of 60 inches or more is light brownish gray and yellowish brown, very friable, calcareous fine sandy loam and very pale yellow and brownish yellow, loose, calcareous sand. In places the surface layer contains more sand and less silt. In some areas the subsoil contains more clay. In other areas the subsoil is thinner.

Included with this soil in mapping are small areas of the well drained Jasper and poorly drained Selma soils. Jasper soils are in the higher, more sloping positions on the landscape. Selma soils are in the lower positions and in drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Darroch soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings with or without basements, the seasonal high water table is a severe limitation and the shrink-swell potential is a moderate limitation. Installing tile drains around the base of foundations helps to lower the seasonal high water table. Reinforcing the foundations, widening foundation trenches, and backfilling with suitable coarse textured material help to prevent the structural damage caused by shrinking and swelling. Grading and land shaping help to remove excess surface water.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a severe limitation. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Onsite investigation is needed. The design of septic tank absorption fields should meet local and State guidelines.

The land capability classification is IIw.

803B—Orthents, 1 to 7 percent slopes. These well drained and moderately well drained soils are in areas where the landscape has been modified by filling, leveling, and shaping. Individual areas occur as highways, cloverleafs of highways, areas adjacent to gravel pits, and fill areas. They are rectangular or irregularly shaped and range from 10 to 150 acres in size.

Included with these soils in mapping are urban areas where concrete, asphalt, buildings, streets, and parking lots cover as much as 65 percent of the surface. Also included are some areas where slopes are steep and very steep. Included areas make up 10 to 15 percent of the unit.

Available water capacity generally is moderate or high in the Orthents, but it varies widely. Permeability also varies because the soils have been compacted by construction equipment and because the texture varies from place to place. Generally, the content of organic matter is moderate and fertility is medium.

Most areas of these soils are idle land or have been developed for urban or other nonfarm uses. Unless the surface is protected by a good plant cover, erosion is a severe hazard. In the more sloping areas, the hazard of erosion is especially severe. In severely eroded areas, special management is needed to establish and maintain a plant cover. Onsite investigation is needed to

determine the limitations affecting different uses in specific areas.

No land capability classification is assigned.

864—Pits, quarries. This map unit consists of excavations from which limestone has been removed and the disturbed areas around the excavations. Individual areas are irregularly shaped and range from 5 to 500 acres in size.

Many of the excavations are filled with water and are identified on the soil maps as water areas. The surrounding soil material generally has been scraped or mixed during mining activities. It generally is low in fertility and organic matter content. Available water capacity varies from place to place.

Included in mapping are small areas of Orthents. These soils are in areas where mine spoil has been mixed with the material from around the pit. They support vegetation. They make up 5 to 15 percent of the unit.

Most areas of this unit are used for recreational development. Some areas are still being mined. The unit is moderately suited to recreational uses. Stocking the water-filled pits with fish and planting trees enhance the recreational areas. The feasibility and extent of reclamation depend on the desired use and the conditions at specific sites. Onsite investigation is needed.

No land capability classification is assigned.

865—Pits, gravel. This map unit consists of excavations from which gravel and sand have been removed and the disturbed areas around the excavations. The gravel is used mainly as roadfill or as fill material for other types of construction. Individual areas are irregular in shape and range from 5 to 500 acres in size.

Many of the excavations are filled with water and are identified on the soil maps as water areas. The surrounding soil material generally has been scraped or mixed during mining activities. It generally is low in fertility and organic matter content. Available water capacity varies from place to place.

Included in mapping are small areas of Orthents. These soils are in areas where mine spoil has been mixed with the material from around the pit. They support vegetation. They make up less than 15 percent of the unit.

Most areas of this unit are used for recreational development. Some areas are still being mined. The unit is moderately suited to recreational facilities. Stocking the water-filled pits with fish and planting trees enhance the recreational areas. Topdressing and grading the disturbed areas help to establish vegetation. The feasibility of reclamation depends on the conditions at the site and the proposed use. Onsite investigation is needed.

No land capability classification is assigned.

871E—Lenzburg silt loam, 12 to 30 percent slopes. This moderately steep, well drained soil is in reclaimed surface-mined areas on uplands. Individual areas are irregular in shape and range from 20 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 3 inches thick. The subsurface layer is mixed dark brown, gray, and brown, firm, calcareous loam about 7 inches thick. The upper part of the underlying material is gray, yellowish brown, and brown, firm, calcareous loam. The next part is gray and brown, firm, calcareous loam. The lower part to a depth of 60 inches or more is gray, dark grayish brown, and dark brown, firm loam mixed with coal refuse material. Shale channers are throughout the underlying material. In some places large limestone and sandstone boulders are on the surface.

Included with this soil in mapping are haulage roads and lanes used for transporting the mined clay and coal and steep and very steep areas, some of which are adjacent to pits and to the final cut. Also included are shallow trenches and depressions. In places the surface is covered by acid mine spoil. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Lenzburg soil at a moderately slow rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is low. The content of rock fragments ranges from 10 to 35 percent, by volume. Crusting and sealing of the surface layer are common after hard rains. Some areas are subject to differential settling and to slumping. The rock fragments and the fragments of dense soil material in the underlying material restrict the penetration of roots. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for recreation or timber production or are idle land. This soil is well suited to woodland wildlife habitat but is poorly suited to pasture. It is moderately suited to timber production. It is generally unsuited to cultivated crops and to dwellings and septic tank absorption fields because of the slope.

If this soil is used for timber production, the hazard of erosion and an equipment limitation are management concerns because of the slope. Seedling mortality and the windthrow hazard are also concerns. They are caused by the high clay content of the soil. Plant competition is also a management concern. It affects the seedlings of desirable species. Logging roads and

skid trails should be established on the contour if possible. On the steeper slopes, logs and trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture after logging has been completed. The use of machinery is limited to periods when the soil is firm enough to support the equipment. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Planting species that can tolerate the conditions caused by the high clay content of the soil reduces the seedling mortality rate. Using harvesting methods that do not leave the remaining trees isolated or widely spaced reduces the windthrow hazard. High-value trees should be removed only from a strip about 50 feet wide along the western and southern edges of the woodland. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

This soil has good potential for use as habitat for woodland wildlife. Adequate stands of herbaceous cover can be maintained, but the slope and the low fertility limit the extent of grain and seed crops. Areas of native hardwoods have good potential as habitat for deer, squirrels, and other woodland wildlife. Protection from fire and from grazing by livestock is essential.

The land capability classification is VIe.

3073—Ross loam, frequently flooded. This nearly level, well drained soil is on flood plains. It is subject to frequent flooding for brief periods during the spring. Individual areas are irregular in shape and range from 3 to 25 acres in size.

Typically, the surface soil is very dark brown and very dark grayish brown, friable loam about 23 inches thick. The subsoil is about 31 inches thick. The upper part is very dark grayish brown, friable loam. The next part is dark brown, friable loam. The lower part is dark yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, friable sandy loam. In some places the surface soil is thinner or contains more sand or silt. In other places the subsoil contains less sand.

Included with this soil in mapping are small areas of the poorly drained Comfrey and somewhat poorly drained Lawson soils. Comfrey soils are in the lower positions on the landscape and in drainageways. Lawson soils contain less sand than the Ross soil. They are in the slightly lower positions on the landscape. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Ross soil at a moderate rate and through the lower part at a moderately rapid rate. Surface runoff is slow. A seasonal high water table is at a depth of 4 to 6 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used for cultivated crops. Some areas are used for hay and pasture or for timber production. This soil is well suited to crops, pasture and hay, and timber production. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, flooding is a hazard. The flooding occurs during the growing season less often than once every 2 years. Dikes or diversions reduce the extent of crop damage caused by floodwater. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate.

If this soil is used for forage or hay, the flooding is a management concern. Dikes and diversions help to control the flooding. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted grazing during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

If this soil is used for timber production, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

3107—Sawmill silty clay loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is subject to frequent flooding for brief periods during the spring. Individual areas are long and narrow and range from 3 to 300 acres in size.

Typically, the surface soil is very dark gray and black, friable silty clay loam about 29 inches thick. The subsoil is about 19 inches thick. It is dark gray, mottled silty clay loam. The upper part is friable, and the lower part is firm. The underlying material to a depth of 60 inches or more is gray and brownish yellow, firm silt

loam. In some areas the surface soil is less than 24 inches thick. In other areas the subsoil contains more sand.

Included with this soil in mapping are small depressions and old oxbows that are ponded for long periods. Included areas make up 2 to 5 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is very slow or ponded. A seasonal high water table is at the surface to 2 feet below the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high. After hard rains a crust commonly forms on the surface.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and well suited to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the wetness is a limitation. The flooding occurs during the growing season less often than once every 2 years. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. Dikes or diversions reduce the extent of crop damage caused by floodwater. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate.

If this soil is used for pasture and hay, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control the flooding. Subsurface tile drains and surface ditches help to lower the water table. Wetness-tolerant grasses should be selected. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The grain and seed crops, grasses, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that protect the habitat from grazing by livestock are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIIw.

3292—Wallkill silt loam, frequently flooded. This nearly level, very poorly drained soil is on outwash plains and till plains. It is frequently flooded for brief periods during the spring. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface soil is black, friable silt loam about 34 inches thick. The underlying material to a depth of 60 inches or more is black, very friable muck. Some partially decomposed plant material is throughout the profile. In some places the surface soil contains more clay. In other places the mineral soil is more than 60 inches thick.

Included with this soil in mapping are small areas of Houghton and Sawmill soils. Houghton soils are in depressions and formed entirely in herbaceous organic materials. Sawmill soils are in the slightly higher positions on the landscape. They formed entirely in silty mineral sediments. Included soils make up 5 to 10 percent of the unit.

Water and air move through the mineral layers of the Wallkill soil at a moderate rate and through the organic layers at a moderately rapid rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface in the spring. Available water capacity is very high. Organic matter content also is very high. The shrink-swell potential is low. The potential for frost action is high.

Most areas are used for cultivated crops. If drained, this soil is moderately suited to cultivated crops. It is generally unsuited to dwellings and septic tank absorption fields because of low strength and the flooding.

If this soil has been adequately drained, corn, soybeans, and small grain can be grown. The flooding and wetness are management concerns. The flooding occurs during the growing season less often than once every 2 years. Measures that maintain or improve the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration.

This soil has good potential for development of wetland wildlife habitat. The native plant species provide good food and cover for wetland wildlife.

The land capability classification is IIIw.

3306—Allison silt loam, frequently flooded. This nearly level, moderately well drained soil is on flood plains. It is frequently flooded for brief periods in the spring. Individual areas are long and narrow and range from 3 to 50 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 22 inches thick. The subsoil is about 26 inches thick. The upper part is very dark grayish brown,

friable silty clay loam. The lower part is dark yellowish brown, mottled, friable silty clay loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silty clay loam. In some places the surface layer is lighter in color. In other places the surface layer is thinner. In a few areas the seasonal high water table is below a depth of 6 feet. In some places the soil has more sand and less clay throughout.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson and poorly drained Sawmill soils. These soils are in the lower positions on the landscape. Also included are areas in depressions that are subject to ponding for long periods. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Allison soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 3 to 6 feet in the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for hay and pasture or for timber production. This soil is well suited to cultivated crops, pasture and hay, and timber production. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard. The flooding occurs during the growing season less often than once every 2 years. Dikes or diversions reduce the extent of crop damage caused by floodwater. A conservation tillage system that leaves crop residue on the surface after planting improves tilth, minimizes surface compaction and crusting, and increases the rate of water infiltration.

If this soil is used for pasture and hay, the flooding is a hazard. Dikes and diversions help to control the flooding. Wetness-tolerant grasses should be selected. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIw.

3405—Zook silty clay loam, frequently flooded. This nearly level, poorly drained soil is on flood plains along streams and in drainageways. It is frequently flooded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface soil is black and very dark gray, friable silty clay loam about 37 inches thick. The subsoil is about 23 inches thick. The upper part is dark gray, mottled, friable silty clay. The lower part is dark gray, mottled, firm silty clay loam. In places the subsoil is thinner. In a few areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Ashkum and Bryce soils. These soils have a thinner dark surface soil than the Zook soil. They make up 2 to 5 percent of the unit.

Water and air move through the Zook soil at a slow rate. Surface runoff is very slow. A seasonal high water table is at the surface to 3 feet below the surface in the spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding and wetness are management concerns. The flooding occurs during the growing season less often than once every 2 years. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. Dikes or diversions reduce the extent of crop damage caused by floodwater. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate.

If this soil is used for pasture and hay, the flooding and the seasonal high water table are management concerns. Dikes and diversions help to control the flooding. Subsurface tile drains and surface ditches help to lower the water table. Wetness-tolerant grasses should be selected. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The grain and seed crops, grasses, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that protect the habitat from grazing by livestock are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance the habitat for wetland wildlife, can be easily established in the oxbows and depressions.

The land capability classification is IIIw.

3451—Lawson silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood

plains. It is subject to frequent flooding for brief periods during the spring. Individual areas are long and narrow and range from 3 to 50 acres in size.

Typically, the surface soil is very dark gray and black, friable silt loam about 33 inches thick. The upper part of the underlying material is very dark grayish brown, mottled, friable silt loam about 8 inches thick. The lower part to a depth of 60 inches or more is dark grayish brown and dark gray, mottled, friable silty clay loam. In some areas the surface layer is lighter in color or contains more clay. In other areas the surface layer is thinner. In a few places the seasonal high water table is at a depth of more than 3 feet. In some areas the soil has more sand throughout.

Included with this soil in mapping are small areas of the poorly drained Sawmill soils in the lower positions on the landscape. Also included are areas in depressions and old oxbows that are subject to ponding for long periods. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Lawson soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for hay and pasture or for timber production. This soil is moderately suited to cultivated crops, pasture and hay, and timber production. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding and wetness are management concerns. The flooding occurs during the growing season less often than once every 2 years. The soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. Dikes or diversions reduce the extent of crop damage caused by floodwater. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate.

If this soil is used for pasture and hay, the flooding and the seasonal high water table are management concerns. Dikes and diversions help to control the flooding. Subsurface tile drains and surface ditches help to lower the water table. Wetness-tolerant grasses should be selected. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

If this soil is used for timber production, seedling mortality is a concern. It is caused by wetness. Also, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

3776—Comfrey loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods during the spring. Individual areas are long and narrow and range from 3 to 150 acres in size.

Typically, the surface soil is black, friable loam and clay loam about 34 inches thick. The underlying material to a depth of 60 inches or more is dark gray and gray, mottled, friable clay loam and silty clay loam. In places the surface soil is less than 24 inches thick. In some areas the surface soil contains more silt or clay. In other areas the subsoil contains more clay.

Included with this soil in mapping are small depressions and old oxbows that are frequently flooded for long periods. Included areas make up 2 to 5 percent of the unit.

Water and air move through the Comfrey soil at a moderate rate. Surface runoff is very slow or ponded. A seasonal high water table is at the surface to 3 feet below the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. Some large areas along major streams support native woodland and have not been drained. This soil is moderately suited to cultivated crops and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding. It is well suited to wetland wildlife habitat.

If this soil is used for corn, soybeans, or small grain, the flooding and wetness are management concerns. The flooding occurs during the growing season less often than once every 2 years. In most areas the soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily

if suitable outlets are available. Dikes or diversions reduce the extent of crop damage caused by floodwater. Keeping tillage to a minimum and returning crop residue to the soil improve tilth and fertility, minimize crusting, and increase the rate of water infiltration. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate.

If this soil is used for pasture and hay, the flooding and the seasonal high water table are management concerns. Dikes and diversions help to control the flooding. Subsurface tile drains and surface ditches help to lower the water table. Wetness-tolerant grasses should be selected. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The grain and seed crops, grasses, and wild herbaceous plants that provide cover for openland wildlife grow well on this soil. Measures that protect the habitat from grazing by livestock are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIw.

4103—Houghton muck, ponded. This nearly level, very poorly drained soil is in depressions on outwash plains and till plains. It is ponded for long periods from September through June. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, this soil is black, very friable muck to a depth of 60 inches or more. Some partially decomposed plant material is throughout the soil. In some areas the surface soil is silt loam. In other areas the underlying material is sandy or loamy. In some places the soil has snail shells throughout.

Included with this soil in mapping are small areas of Comfrey soils. These soils are in the slightly higher landscape positions. Also included are small areas that are ponded throughout most of the growing season. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Houghton soil at a moderately slow to moderately rapid rate. Surface runoff is very slow or ponded. A seasonal high water table is 2 feet above to 0.5 foot below the surface in the spring. Available water capacity is very high. Organic matter content also is very high. The potential for frost action is high. The soil is very unstable. It is highly compressible when subjected to heavy loads and is susceptible to subsidence if drained.

Most areas have not been drained and are not cultivated. A few small areas are drained. This soil is well suited to habitat for wetland wildlife. It generally is unsuited to cultivated crops and to hay and pasture because of the ponding. It is poorly suited to habitat for openland wildlife. It generally is unsuited to dwellings and septic tank absorption fields because of the ponding and the subsidence.

Areas of this soil provide good habitat for wetland wildlife. The soil naturally supports wetland plants, and shallow water areas are available.

The land capability classification is VIIIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in Livingston County that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1987, about 619,946 acres in Livingston County was used as cropland *(9)*. About 12,419 acres was permanent pasture, and 6,688 acres was woodland. The rest of the land in the county is used for roads, buildings, drainageways, or recreational areas. The soils have good potential for increased crop production, particularly corn, soybeans, and wheat.

The demand for food and fiber has increased in recent years. As a result, some land of marginal quality has been used for crops. Much of this land is more susceptible to erosion than the more productive land. Also, the number of small residential tracts has increased throughout the county. These tracts commonly are in areas of prime farmland. If these trends continue, they could result in a significant decline in the quality and quantity of the land used for food and fiber.

The main management concerns affecting crops and pasture in Livingston County are the hazard of water erosion, the hazard of soil blowing, the seasonal high water table, soil fertility, restricted permeability, soil tilth, and limited supplies of soil moisture.

Water erosion is a major problem on about 20 percent of the cropland and pasture in the county. It is a hazard in areas where the slope is more than 2 percent or in areas where the slope is more than 1 percent and runoff water is concentrated.

Loss of the surface layer through erosion is damaging for several reasons. The productivity of most soils is reduced as the surface layer is eroded away and the subsoil is incorporated into the plow lower.

Also, severe erosion on sloping soils results in the deterioration of tilth in the surface soil and reduces the rate of water infiltration. Erosion is especially damaging on soils that have a low content of organic matter because these soils tend to become cloddy if they are worked when too wet and are likely to form a crust after hard rains. Preparing a good seedbed is difficult on these soils because of the cloddiness. If the surface is crusted, the rate of water infiltration is reduced and the runoff rate is increased. Finally, erosion can result in the sedimentation of drainage ditches, streams, lakes, rivers, and roadside ditches. Erosion control can minimize this pollution and can improve the quality of water for municipal and recreational uses and for fish and wildlife.

Terraces, contour farming, and a conservation tillage system help to control erosion. These practices also increase the rate of water infiltration and reduce the runoff rate. Terraces are most effective in areas where slopes are smooth and uniform. On many soils, a conservation tillage system that leaves crop residue on the surface throughout the year, such as no-till farming or chisel plowing, significantly reduces the hazard of erosion. No-till farming is most effective on moderately well drained and well drained soils, and ridge planting is more effective on somewhat poorly drained soils.

Soil blowing is a hazard during part of winter and early in spring. It can be reduced by maintaining a cover of vegetation, leaving crop residue on the surface throughout the winter, or keeping the surface rough. Windbreaks of suitable trees or shrubs are also effective in controlling soil blowing.

Additional information about erosion-control measures is provided in the "Technical Guide," which is available in local offices of the Natural Resources Conservation Service.

A drainage system has been installed in most areas of somewhat poorly drained and poorly drained soils in the county. As a result, these soils are sufficiently drained for the crops commonly grown. In some areas, measures that maintain or improve the drainage system are needed. Unless they are drained, somewhat poorly drained soils are wet enough in some years that productivity is reduced. Chenoa, Clarence, Elliott, and Whitaker soils are examples of somewhat poorly drained soils.

The design of surface and subsurface drainage systems varies, depending on the kind of soil. In many soils, tile drains are inadequate. A combination of shallow surface drains and tile drains is needed in some areas of poorly drained soils. Tile drains are not effective in Bryce, Clarence, Rowe, Swygert, and other slowly permeable or very slowly permeable soils unless surface inlets are used to drain wet spots. If suitable outlets are available, tile drains are adequate in areas of moderately permeable and moderately slowly permeable soils.

Droughtiness limits yields on some of the soils used for crops and pasture. Onarga soils, for example, are so porous that during dry periods they are unable to store the water necessary to maintain optimum plant growth. Some soils, such as Chatsworth, Clarence, and Nappanee soils, have restrictive layers that cannot be easily penetrated by plant roots. These soils dry out quickly, and moisture stress may be evident on hot, windy days.

Droughtiness can be minimized by increasing the rate of water infiltration, reducing the runoff rate, or planting crops that are tolerant of droughty conditions. Planting cover crops and using a system of conservation tillage that leaves crop residue on the surface after planting increase the rate of water infiltration and reduce the runoff rate. Droughty soils generally are better suited to soybeans and grain sorghum than to corn. They also are better suited to winter wheat, which matures in early summer.

Soil fertility is naturally high in most of the soils in the county. Some soils, however, such as Nappanee, Starks, and Whitaker soils, are low in fertility and have low reaction in the subsoil. On these soils, applications of agricultural lime can raise the pH level sufficiently for optimum plant growth. Applications of lime are not needed on Harpster or Pella soils, which generally have a high pH in the root zone.

Most of the soils that formed under forest vegetation have a light-colored surface layer and have a naturally low supply of nitrogen. Some crops, particularly corn and wheat, respond well to applications of nitrogen fertilizer. Planting legumes, which take nitrogen from the air, and adding livestock manure help to replenish the nitrogen supply. Soil tests are needed to determine the amount of lime and fertilizer to be applied. Assistance is available at the local office of the Cooperative Extension Service.

Soil tilth is an important factor influencing the germination of seeds, the amount of runoff, and the rate of water infiltration. A surface soil that has good tilth is granular and porous. Poor tilth is a problem in eroded areas of Clarence soils and on the poorly drained Bryce and Rowe soils. These soils often stay wet until late in spring. If plowed when wet, they tend to become very cloddy. Preparing a good seedbed is difficult because of the cloddiness. Chisel plowing or tilling in the fall generally results in good tilth in spring if crop residue is left on the surface.

The field crops suited to the soils and climate of the survey area include many that are not commonly grown. The main crops are corn and soybeans. Wheat,

sorghum, barley, and some specialty crops, such as strawberries, popcorn, and sweet corn, are also grown.

Suitable pasture and hay plants include several species of legumes, cool-season grasses, and warm-season native grasses. Alfalfa and red clover are the common legumes grown for hay. They are also used in mixtures with bromegrass and orchardgrass for hay and pasture. Suitable warm-season native grasses include little bluestem, indiangrass, and switchgrass. These grasses grow well in summer. The establishment and grazing of these species require different management than cool-season grasses.

Overgrazing reduces the vigor of pasture plants and reduces forage production. It also results in an increase in the extent of weeds and brush. Measures that maintain soil fertility, deferred grazing, rotation grazing, and proper stocking rates help to prevent overgrazing. Deferred grazing allows the plants in pastures that are not being used to build up reserves of carbohydrates. Rotating grazing among several pastures allows each area a rest period.

Many of the soils in the survey area have a high water table in spring. Deferred grazing during wet periods can minimize surface compaction. Pasture renovation also helps to prevent compaction. Frost heave can damage alfalfa and red clover in areas that have a seasonal high water table. Leaving a cover of stubble 4 to 6 inches high during the winter and using mixtures of grasses and legumes help to prevent frost heave.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(3)*. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(6)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol,* a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X,* stoniness or rockiness; *W,* excess water in or on the soil; *T,* toxic substances in the soil; *D,* restricted rooting depth; *C,* clay in the upper part of the soil; *S,* sandy texture; *F,* a high content of rock fragments in the soil; and *N,* snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep

enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes

and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, bromegrass, lespedeza, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, indiangrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, hackberry, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are dogwood, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil

properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, buttonbush, cattails, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas (fig. 10). Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Figure 10.—A natural wetland area east of Pontiac.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed

soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise

the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications

for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth

to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The

percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6

percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table

17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(7)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(8)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(7)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allison Series

The Allison series consists of moderately well drained, moderately permeable soils on flood plains. These soils formed in silty alluvial material. Slopes range from 0 to 2 percent.

Allison soils are similar to Ross soils and are

commonly adjacent to Lawson and Sawmill soils on the landscape. The somewhat poorly drained Lawson and poorly drained Sawmill soils are in the lower positions on the landscape. The well drained Ross soils are in the slightly higher positions. They contain more sand throughout the solum than the Allison soils.

Typical pedon of Allison silt loam, frequently flooded, 1,340 feet east and 1,180 feet south of the northwest corner of sec. 26, T. 29 N., R. 4 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A—10 to 22 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

Bw1—22 to 35 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Bw2—35 to 41 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

BC—41 to 48 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct dark brown (7.5YR 4/4) mottles; weak medium prismatic structure; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

C—48 to 60 inches; brown (10YR 5/3) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine dark accumulations of iron and manganese oxides; slightly acid.

The thickness of the solum ranges from 30 to 60 inches. Depth to free carbonates ranges from 40 to more than 60 inches. The thickness of the mollic epipedon ranges from 24 to 60 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bw and BC horizons have value and chroma of 2 to 4. The C horizon has value of 4 to 6 and chroma of 3 to 6.

Alvin Series

The Alvin series consists of moderately well drained soils that formed in eolian sands on outwash plains. These soils are moderately permeable in the upper part of the subsoil and moderately rapidly permeable in the lower part of the subsoil and in the underlying material. Slopes range from 1 to 5 percent.

Alvin soils are similar to Tuscola and Onarga soils and are commonly adjacent to Selma and Whitaker soils on the landscape. Tuscola soils contain more clay in the control section than the Alvin soils. Onarga soils are in landscape positions similar to those of the Alvin soils. They contain more organic matter in the surface layer than the Alvin soils and do not have an E horizon. The poorly drained Selma soils are in low, nearly level positions on the landscape. They contain more organic matter in the surface layer than the Alvin soils and contain more clay in the control section. The somewhat poorly drained Whitaker soils are in the slightly lower positions on the landscape. They contain more clay in the control section than the Alvin soils.

Typical pedon of Alvin fine sandy loam, 1 to 5 percent slopes, 490 feet south and 2,460 feet west of the northeast corner of sec. 34, T. 27 N., R. 6 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) fine sandy loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; very friable; few very fine roots; moderately acid; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium prismatic structure parting to weak fine angular blocky; very friable; few very fine roots; common prominent dark brown (7.5YR 4/4) clay films on faces of peds; few distinct dark brown (10YR 4/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—13 to 21 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium prismatic structure parting to weak medium angular blocky; very friable; few very fine roots; common prominent (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

E&Bt—21 to 37 inches; yellowish brown (10YR 5/4) (E) and dark brown (7.5YR 4/4) (Bt) loamy fine sand; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; very friable; slightly acid; clear smooth boundary.

C—37 to 60 inches; yellowish brown (10YR 5/4) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; single grain; loose; slightly acid.

The thickness of the solum ranges from 36 to 60

inches. Some pedons do not have a banded E&Bt horizon in the lower part of the control section.

The A horizon has value of 3 or 4 and chroma of 2 or 3. The banded E&Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. The C horizon has value of 4 to 6 and chroma of 3 to 6.

Andres Series

The Andres series consists of somewhat poorly drained soils on till plains. These soils formed in a thin layer of loess, loamy outwash, and silty clay loam glacial till or lacustrine sediments on till plains and moraines. Permeability is moderate in the upper part of the solum and slow in the lower part of the solum and in the underlying material. Slopes range from 0 to 2 percent.

Andres soils are similar to Elliott and La Hogue soils and commonly are adjacent to Reddick and Symerton soils on the landscape. Elliott soils contain more clay in the solum than the Andres soils. La Hogue soils formed entirely in loamy outwash. The poorly drained Reddick soils are in the lower positions and in drainageways. The moderately well drained Symerton soils are in the more sloping, higher positions on the landscape.

Typical pedon of Andres loam, 0 to 2 percent slopes, 510 feet east and 1,525 feet south of the northwest corner of sec. 27, T. 30 N., R. 8 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

BA—11 to 14 inches; dark brown (10YR 4/3) clay loam; common fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—14 to 19 inches; dark brown (10YR 4/3) clay loam; common fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt2—19 to 26 inches; grayish brown (10YR 5/2) clay loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt3—26 to 36 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; common faint dark gray (10YR 4/1) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Bt4—36 to 50 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium prominent gray (N 5/0) mottles; weak medium prismatic structure; firm; few very fine roots; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; common pebbles; very slight effervescence; slightly alkaline; clear smooth boundary.

2C—50 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium prominent gray (N 5/0) mottles; massive; firm; few fine dark concretions of iron and manganese oxides; common pebbles; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 36 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is clay loam, silty clay loam, or sandy clay loam in the upper part and silty clay loam or silt loam in the lower part.

Ashkum Series

The Ashkum series consists of poorly drained soils on till plains. These soils formed in silty local outwash and silty clay loam glacial till. Permeability is moderately slow in the subsoil and slow in the underlying material. Slopes range from 0 to 2 percent.

Ashkum soils are similar to Bryce and Milford soils and commonly are adjacent to Elliott and Varna soils on the landscape. Bryce soils contain more clay throughout than the Ashkum soils. The somewhat poorly drained Elliott and moderately well drained Varna soils are in the higher positions on the landscape. Milford soils formed in lacustrine sediments.

Typical pedon of Ashkum silty clay loam, 114 feet west and 2,565 feet south of the center of sec. 21, T. 29 N., R. 8 E.

Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (2.5Y 4/0) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A—7 to 13 inches; black (N 2/0) silty clay loam, dark

gray (2.5Y 4/0) dry; moderate fine granular structure; friable; few fine roots; neutral; clear smooth boundary.

AB—13 to 20 inches; black (N 2/0) silty clay loam, dark gray (2.5Y 4/0) dry; moderate fine subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

Bg1—20 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; common prominent black (N 2/0) organic coatings on faces of peds; few distinct dark gray (10YR 4/1) pressure faces on vertical faces of peds; black (N 2/0) krotovina 1 inch thick; slightly acid; clear smooth boundary.

Bg2—26 to 31 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent dark brown (7.5YR 4/4) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; firm; few fine roots; few distinct dark gray (2.5Y 4/0) pressure faces on vertical faces of peds; black (N 2/0) krotovina 2 inches thick; neutral; clear smooth boundary.

2Bg3—31 to 39 inches; gray (5Y 6/1) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak fine prismatic structure parting to weak medium angular blocky; firm; few fine roots; few faint gray (5Y 5/1) pressure faces on vertical faces of peds; few pebbles; neutral; clear smooth boundary.

2BCg—39 to 47 inches; gray (5Y 5/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few fine roots; few faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2Cg—47 to 60 inches; gray (5Y 5/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; many pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The depth to free carbonates commonly is less than the thickness of the solum. The thickness of the mollic epipedon ranges from 10 to 22 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is silty clay loam or silty clay. The 2C horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 to 6.

Barrington Series

The Barrington series consists of moderately well drained, moderately permeable soils on outwash plains and lake plains. These soils formed in loess and calcareous, silty lacustrine and loamy outwash materials. Slopes range from 2 to 5 percent.

Barrington soils are similar to Jasper soils and commonly are adjacent to Harco and Patton soils on the landscape. The somewhat poorly drained Harco and poorly drained Patton soils are in the lower positions on the landscape. The well drained Jasper soils are in landscape positions similar to those of the Barrington soils. They contain more sand throughout than the Barrington soils and do not have carbonates above a depth of 40 inches.

Typical pedon of Barrington silt loam, 2 to 5 percent slopes, 400 feet north and 190 feet west of the center of sec. 16, T. 30 N., R. 3 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

BA—11 to 16 inches; dark brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure parting to moderate fine granular; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; few faint dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—26 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine prismatic structure parting to moderate medium angular blocky; friable; few faint dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2Bt4—32 to 37 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak fine prismatic structure parting to weak medium angular blocky; friable; very

few faint dark brown (10YR 4/3) clay films on faces of peds; very slight effervescence; neutral; clear smooth boundary.

2BC—37 to 42 inches; yellowish brown (10YR 5/4) silt loam that has thin strata of fine sandy loam; common fine distinct light brownish gray (10YR 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; friable; slight effervescence; slightly alkaline; clear smooth boundary.

2C—42 to 60 inches; yellowish brown (10YR 5/4), stratified silt loam and fine sandy loam; common fine distinct light brownish gray (10YR 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 30 to 45 inches. The depth to free carbonates ranges from 20 to 40 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. The 2B and 2C horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. They are stratified silt loam, sandy loam, fine sandy loam, loam, or clay loam.

Blount Series

The Blount series consists of somewhat poorly drained, slowly permeable soils on till plains. These soils formed in loess and silty clay loam glacial till. Slopes range from 0 to 4 percent.

Blount soils are similar to Del Rey and Elliott soils and commonly are adjacent to Ashkum soils on the landscape. The poorly drained Ashkum soils are in shallow depressions and in drainageways. Del Rey soils formed in lacustrine sediments. Elliott soils are in landscape positions similar to those of the Blount soils. They have more organic matter in the surface layer than the Blount soils.

Typical pedon of Blount silt loam, 0 to 2 percent slopes, 2,480 feet south and 1,203 feet west of the northeast corner of sec. 29, T. 26 N., R. 6 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; few fine roots; moderately acid; abrupt smooth boundary.

E—7 to 13 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

Bt1—13 to 17 inches; brown (10YR 5/3) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; common distinct dark grayish brown (2.5YR 4/2) clay films on faces of peds; few pebbles; moderately acid; clear smooth boundary.

2Bt2—17 to 26 inches; grayish brown (10YR 5/2) silty clay; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; common distinct dark grayish brown (2.5YR 4/2) clay films on faces of peds; common medium dark concretions of iron and manganese oxides; few pebbles; slightly acid; clear smooth boundary.

2Bt3—26 to 32 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium prominent light gray (5Y 6/1) mottles; moderate medium prismatic structure parting to weak medium angular blocky; friable; few very fine roots; common prominent gray (5Y 5/1) clay films on faces of peds; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2C—32 to 60 inches; light olive brown (2.5Y 5/4) and light gray (5Y 6/1) silty clay loam; massive; firm; common medium light-colored concretions of calcium carbonate; few pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 24 to 36 inches. The depth to free carbonates ranges from 19 to 40 inches.

The Ap horizon has chroma of 1 to 3. The E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is silty clay loam or silty clay. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6.

Brenton Series

The Brenton series consists of somewhat poorly drained, moderately permeable soils on outwash plains. These soils formed in 24 to 40 inches of loess or silty sediments and loamy outwash. Slopes range from 0 to 2 percent.

Brenton soils are similar to La Hogue soils and commonly are adjacent to Drummer soils on the landscape. The poorly drained Drummer soils are in the lower positions on the landscape. La Hogue soils are in landscape positions similar to those of the Brenton soils. They contain more sand in the subsoil than the Brenton soils.

Typical pedon of Brenton silt loam, 0 to 2 percent slopes, 60 feet west and 1,760 feet south of the northeast corner of sec. 29, T. 30 N., R. 4 E.

Ap—0 to 12 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Bt1—12 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—18 to 24 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—24 to 28 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt4—28 to 34 inches; grayish brown (10YR 5/2) clay loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

2Bt5—34 to 44 inches; grayish brown (10YR 5/2) sandy loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2C—44 to 60 inches; grayish brown (10YR 5/2), stratified sandy loam and loamy sand; common fine distinct yellowish brown (10YR 5/6) mottles; massive; very friable; few pebbles; neutral.

The thickness of the solum ranges from 40 to 58 inches. The depth to free carbonates is more than 40 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The 2Bt and 2C horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. They are stratified clay loam, sandy loam, and loamy sand.

Bryce Series

The Bryce series consists of poorly drained soils on till plains. These soils formed in clayey lacustrine sediments and clayey, calcareous glacial till. Permeability is slow in the upper part of the subsoil and very slow in the lower part of the subsoil and in the underlying material. Slopes range from 0 to 2 percent.

Bryce soils are similar to Milford and Rowe soils and commonly are adjacent to Swygert soils on the landscape. Milford and Rowe soils are in landscape positions similar to those of the Bryce soils. They formed entirely in lacustrine sediments. Rowe soils contain more clay in the control section than the Bryce soils. The somewhat poorly drained Swygert soils are higher on the landscape than the Bryce soils.

Typical pedon of Bryce silty clay, 120 feet north and 1,310 feet west of the southeast corner of sec. 21, T. 30 N., R. 6 E.

Ap—0 to 11 inches; black (2.5Y 2/0) silty clay, dark gray (2.5Y 4/0) dry; moderate fine granular structure; firm; few very fine roots; neutral; abrupt smooth boundary.

Bg1—11 to 16 inches; dark grayish brown (10YR 4/2) silty clay; few fine distinct grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few distinct very dark grayish brown (2.5Y 3/2) pressure faces on vertical faces of peds; common prominent black (2.5Y 2/0) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—16 to 20 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; common faint very dark grayish brown (2.5Y 3/2) pressure faces on vertical faces of peds; few distinct black (2.5Y 2/0) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg3—20 to 29 inches; grayish brown (2.5Y 5/2) silty clay; common fine distinct light olive brown (2.5Y 5/4) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular

blocky; firm; few very fine roots; common faint dark grayish brown (2.5Y 4/2) pressure faces on vertical faces of peds; very dark grayish brown (2.5Y 3/2), vertical krotovina in the lower part; neutral; clear smooth boundary.

Bg4—29 to 39 inches; olive gray (5Y 5/2) silty clay; common fine prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium angular blocky; firm; few very fine roots; common faint gray (5Y 5/1) pressure faces on vertical faces of peds; dark gray (2.5YR 4/0), vertical krotovina in the lower part; few fine dark accumulations of iron and manganese oxides; slightly alkaline; clear smooth boundary.

2BCg—39 to 48 inches; olive gray (5Y 5/2) silty clay; many medium prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure; firm; few very fine roots; dark gray (2.5Y 4/0), vertical krotovina in the upper part; few fine dark accumulations of iron and manganese oxides; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2Cg—48 to 60 inches; dark gray (5Y 4/1) silty clay; many medium prominent dark yellowish brown (10YR 4/6) mottles; massive; firm; few very fine roots; black (2.5Y 2/0), vertical krotovina; few pebbles; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 35 to 60 inches. The depth to free carbonates commonly is less than the thickness of the solum. The thickness of the mollic epipedon ranges from 11 to 24 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. The 2C horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 to 6.

Camden Series

The Camden series consists of moderately well drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess and loamy outwash. Slopes range from 2 to 5 percent.

Camden soils are similar to Tuscola soils and commonly are adjacent to Selma and Starks soils on the landscape. The poorly drained Selma and somewhat poorly drained Starks soils are in the lower positions on the landscape. Selma soils have a mollic epipedon. Selma and Tuscola soils contain more sand throughout the solum than the Camden soils.

Typical pedon of Camden silt loam, 2 to 5 percent slopes, 2,200 feet west and 1,020 feet south of the northeast corner of sec. 7, T. 30 N., R. 4 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light grayish brown (10YR 6/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

E—7 to 13 inches; dark grayish brown (10YR 4/2) silt loam, light grayish brown (10YR 6/2) dry; moderate thin platy structure; friable; few very fine roots; few distinct light gray (10YR 7/1) silt coatings on faces of peds; moderately acid; abrupt smooth boundary.

Bt1—13 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—18 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—23 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; moderately acid; clear smooth boundary.

2Bt4—30 to 38 inches; yellowish brown (10YR 5/4) loam; many medium distinct light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; moderately acid; clear smooth boundary.

2BC—38 to 47 inches; yellowish brown (10YR 5/6), stratified silt loam and very fine sandy loam; many medium distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure; friable; few very fine roots; few fine dark accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

2C—47 to 60 inches; yellowish brown (10YR 5/6), stratified silt loam and very fine sandy loam; many moderate medium distinct light brownish gray (10YR 6/2) and common medium prominent dark brown (7.5YR 4/4) mottles; massive; friable; common fine dark accumulations of iron and manganese oxides; neutral.

The thickness of the solum ranges from 40 to 60

inches. The depth to free carbonates is more than 60 inches. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E horizon has value of 4 to 6 and chroma of 2 to 4. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. The 2B horizon has value of 4 to 6 and chroma of 3 to 6. It is silt loam, sandy loam, or loam. The 2C horizon has value of 4 to 6 and chroma of 3 to 6. It is sandy loam, loam, or silt loam.

Chatsworth Series

The Chatsworth series consists of moderately well drained, very slowly permeable soils on till plains. These soils formed in silty clay or silty clay loam glacial till. Slopes range from 4 to 20 percent.

Chatsworth soils are similar to Clarence and Hennepin soils and commonly are adjacent to Clarence and Rowe soils on the landscape. The somewhat poorly drained Clarence soils are in the less sloping positions. They have a mollic epipedon. Hennepin soils are in landscape positions similar to those of the Chatsworth soils. They contain less clay in the solum than the Chatsworth soils. The poorly drained Rowe soils are in the lower positions on the landscape.

Typical pedon of Chatsworth silty clay, 4 to 10 percent slopes, 174 feet north and 779 feet east of the southwest corner of sec. 2, T. 29 N., R. 5 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silty clay, light brownish gray (2.5Y 6/2) dry; mixed with some pockets of grayish brown (2.5Y 5/2) silty clay subsoil material; moderate fine subangular blocky structure; friable; common very fine roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

Bk1—8 to 12 inches; grayish brown (2.5Y 5/2) silty clay; few fine distinct olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; firm; common very fine roots; few faint dark grayish brown (2.5Y 4/2) pressure faces on vertical faces of peds; strong effervescence; moderately alkaline; clear smooth boundary.

Bk2—12 to 16 inches; grayish brown (2.5Y 5/2) silty clay; few fine prominent reddish brown (5YR 5/4), common fine prominent gray (2.5Y 5/0), and common fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; firm; common very fine roots; few faint dark grayish brown (2.5Y 4/2) pressure faces on vertical faces of peds; few pebbles; strong effervescence; moderately alkaline; clear smooth boundary.

Bk3—16 to 36 inches; olive gray (5Y 5/2) silty clay; common medium prominent light olive brown (2.5Y 5/4) and few fine prominent reddish brown (5YR 5/4) mottles; weak coarse prismatic structure; very firm; few very fine roots; many faint olive gray (5Y 4/2) pressure faces on vertical cleavage planes; few coarse light-colored accumulations of calcium carbonate; common pebbles; strong effervescence; moderately alkaline; clear smooth boundary.

C—36 to 60 inches; dark grayish brown (2.5Y 4/2) silty clay; many coarse distinct gray (2.5Y 5/0) and common medium distinct olive brown (2.5Y 4/4) mottles; massive; extremely firm; few very fine roots; few distinct olive gray (5Y 4/2) pressure faces on vertical cleavage planes; few fine light-colored accumulations of calcium carbonate; few medium concretions of iron and manganese oxides; common pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 10 to 40 inches. The depth to free carbonates is less than 20 inches.

The A horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has chroma of 0 to 2. The Bw horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 2 or 3. The 2-chroma colors are considered to be relict. The Bw horizon is silty clay or clay. The C horizon has hue of 2.5Y or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 6. It is commonly silty clay, but the range includes silty clay loam or clay.

Chenoa Series

The Chenoa series consists of somewhat poorly drained soils on till plains. These soils formed in loess and silty clay loam glacial till. Permeability is moderate in the solum and slow in the underlying material. Slopes range from 0 to 5 percent.

Chenoa soils are similar to Elliott and Martinton soils and commonly are adjacent to Ashkum and Graymont soils on the landscape. The poorly drained Ashkum soils are in the lower positions on the landscape. Elliott soils are in landscape positions similar to those of the Chenoa soils. They have a thinner mantle of loess over the glacial till. Martinton soils formed in lacustrine sediments. The moderately well drained Graymont soils contain less clay in the solum than the Chenoa soils. They are on adjacent side slopes.

Typical pedon of Chenoa silty clay loam, 0 to 2 percent slopes, 825 feet west and 100 feet south of the northeast corner of sec. 2, T. 27 N., R. 3 E.

Ap—0 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

BA—12 to 16 inches; brown (10YR 4/3) silty clay loam; few fine faint dark grayish brown (10YR 4/2)

mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 21 inches; brown (10YR 4/3) silty clay loam; few fine distinct gray (10YR 5/1) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—21 to 26 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint gray (10YR 5/1) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; many faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; common medium dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Bt3—26 to 32 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint gray (10YR 5/1) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few very fine roots; common medium dark accumulations of iron and manganese oxides; slightly alkaline; clear smooth boundary.

2Bt4—32 to 36 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct gray (2.5Y 6/0) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few very fine roots; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few pebbles; slightly alkaline; clear smooth boundary.

2C—36 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct gray (2.5Y 6/1) mottles; massive; firm; few prominent light brownish gray (10YR 6/2) silt coatings on vertical cleavage planes; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 50 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay loam or silty clay. The C horizon is dominantly silty clay loam, but the range includes silt loam that is high in content of clay.

Clarence Series

The Clarence series consists of somewhat poorly drained, very slowly permeable soils on till plains. These soils formed in less than 10 inches of loess and silty clay or clay glacial till. Slopes range from 0 to 7 percent.

Clarence soils are similar to Swygert soils and commonly are adjacent to Chatsworth and Rowe soils on the landscape. The moderately well drained Chatsworth soils are on the steeper slopes. They have a thinner solum than the Clarence soils. Swygert soils are in landscape positions similar to those of the Clarence soils. They have less clay in the control section than the Clarence soils. The poorly drained Rowe soils are in the lower positions on the landscape.

Typical pedon of Clarence silty clay loam, 0 to 2 percent slopes, 100 feet west and 400 feet south of the northeast corner of sec. 25, T. 30 N., R. 4 E.

Ap—0 to 13 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

Btg1—13 to 18 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; very firm; few very fine roots; common faint very dark grayish brown (2.5Y 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Btg2—18 to 22 inches; grayish brown (2.5Y 5/2) clay; many fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; very firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.

2Btg3—22 to 28 inches; grayish brown (2.5Y 5/2) clay; common medium distinct light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to moderate medium angular blocky; very firm; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2Cgk—28 to 60 inches; grayish brown (2.5Y 5/2) clay; common medium distinct light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; very firm; few very fine roots; common distinct gray (2.5Y 5/0) coatings on pressure faces; few pebbles; few fine light-colored accumulations of calcium carbonate; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 25 to 38 inches. The depth to free carbonates ranges from 20 to 36 inches. The thickness of the mollic epipedon ranges from 6 to 17 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 6. It is commonly silty clay, but the range includes silty clay loam or clay. The C horizon has value of 4 to 6 and chroma of 1 to 6. It is commonly silty clay, but the range includes clay.

Clarence silty clay loam, 2 to 4 percent slopes, eroded, and Clarence silty clay loam, 4 to 7 percent slopes, eroded, have a thinner dark surface layer than is defined as the range for the series.

Comfrey Series

The Comfrey series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in loamy alluvial sediments. Slopes range from 0 to 2 percent.

Comfrey soils are similar to Sawmill and Zook soils and commonly are adjacent to Jasper and La Hogue soils on the landscape. The well drained Jasper and somewhat poorly drained La Hogue soils have a thinner surface layer than the Comfrey soils. They are in the higher positions on the landscape. Sawmill and Zook soils are in landscape positions similar to those of the Comfrey soils. Sawmill soils are fine-silty. Zook soils are fine textured.

Typical pedon of Comfrey loam, frequently flooded, 3,960 feet west and 750 feet south of the northeast corner of sec. 5, T. 25 N., R. 8 E.

Ap—0 to 8 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A1—8 to 19 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak medium prismatic structure parting to weak medium angular blocky; friable; few very fine roots; neutral; clear smooth boundary.

A2—19 to 27 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; few fine prominent dark brown (7.5YR 4/4) mottles; weak medium prismatic structure parting to weak medium angular blocky; friable; few very fine roots; neutral; clear smooth boundary.

A3—27 to 34 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; common fine prominent dark brown (7.5YR 4/4) mottles; weak medium prismatic structure parting to weak medium angular blocky; friable; few very fine roots; neutral; clear smooth boundary.

Cg1—34 to 43 inches; dark gray (5Y 4/1) clay loam; many fine prominent dark brown (7.5YR 4/4) mottles; weak medium prismatic structure; friable; slightly alkaline; clear smooth boundary.

Cg2—43 to 60 inches; gray (5Y 5/1), stratified clay loam and silty clay loam; many medium prominent brown (7.5YR 4/4) mottles; massive; friable; slightly alkaline.

The thickness of the solum ranges from 24 to 36 inches. The depth to free carbonates ranges from 18 to more than 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Cg horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 or 2. It is loam, clay loam, silt loam, or silty clay loam.

Crane Series

The Crane series consists of somewhat poorly drained soils on outwash plains and terraces. These soils formed in loamy outwash over gravelly outwash. They are moderately permeable in the solum and very rapidly permeable in the underlying material. Slopes range from 0 to 2 percent.

Crane soils are similar to Andres and La Hogue soils and commonly are adjacent to Jasper, Wea, and Westland soils on the landscape. Andres soils contain more clay in the lower part of the subsoil and in the underlying material than the Crane soils. La Hogue soils and the well drained Jasper soils contain less gravel in the lower part of the subsoil and in the underlying material than the Crane soils. Jasper soils and the well drained Wea soils are in the higher positions on the landscape. The poorly drained Westland soils are in the lower positions on the landscape.

Typical pedon of Crane loam, 1,540 feet south and 432 feet west of the center of sec. 26, T. 28 N., R. 5 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

BA—11 to 16 inches; dark grayish brown (10YR 4/2) clay loam; few fine faint brown (10YR 5/3) mottles; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 22 inches; brown (10YR 5/3) clay loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; few faint dark

grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles; neutral; clear smooth boundary.

Bt2—22 to 31 inches; brown (10YR 5/3) loam; common fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2Bt3—31 to 41 inches; grayish brown (10YR 5/2) gravelly sandy loam; common medium distinct yellowish brown (10YR 5/6) and few fine faint gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt4—41 to 51 inches; gray (10YR 5/1) gravelly sandy loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

2BC—51 to 55 inches; yellowish brown (10YR 5/6) gravelly sandy loam; moderate medium prominent gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; slight effervescence; slightly alkaline; clear smooth boundary.

2C—55 to 60 inches; brown (10YR 5/3) very gravelly loamy coarse sand; single grain; loose; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has chroma of 1 to 3. The Bt horizon has value of 3 to 5 and chroma of 1 to 6. It is clay loam or loam in the upper part and gravelly sandy loam or gravelly sandy clay loam in the lower part. The 2C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4.

Darroch Series

The Darroch series consists of somewhat poorly drained, moderately permeable soils on outwash plains. These soils formed in silty and loamy sediments. Slopes range from 0 to 2 percent.

Darroch soils are similar to Andres and La Hogue soils and commonly are adjacent to Selma soils on the landscape. Andres and La Hogue soils are in landscape positions similar to those of the Darroch soils. Andres soils are underlain by glacial till. La Hogue soils have a thinner solum than the Darroch soils. The poorly drained Selma soils are in the lower positions on the landscape.

Typical pedon of Darroch silt loam, 2,565 feet south and 40 feet west of the center of sec. 24, T. 33 N., R. 7 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.

AB—10 to 16 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak or moderate fine granular structure; friable; few fine yellowish brown (10YR 5/4) fragments of subsoil material; neutral; clear smooth boundary.

Bt1—16 to 21 inches; dark grayish brown (10YR 4/2) clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; weak or moderate coarse subangular blocky structure parting to weak or moderate fine subangular blocky; friable; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—21 to 28 inches; yellowish brown (10YR 5/4) clay loam; few fine distinct grayish brown (10YR 5/2) mottles; weak or moderate coarse subangular blocky structure; friable; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BC—28 to 39 inches; light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/8) loam; weak coarse subangular blocky structure; friable; few prominent dark grayish brown (10YR 4/2) organic stains in root channels; many fine dark accumulations of iron and manganese oxides; slightly alkaline; gradual smooth boundary.

C1—39 to 49 inches; mixed light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/8) fine sandy loam; massive; very friable; few prominent dark grayish brown (10YR 4/2) krotovinas at the base of the horizon; many fine dark accumulations of iron and manganese oxides; slight effervescence; moderately alkaline; clear smooth boundary.

2C2—49 to 60 inches; mixed very pale yellow (10YR 7/4) and brownish yellow (10YR 6/6) sand; single grain; loose; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The C horizon has hue of

10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 6. It contains thin strata of sandy material.

Del Rey Series

The Del Rey series consists of somewhat poorly drained, slowly permeable soils on lake plains. These soils formed in lacustrine sediments. Slopes range from 0 to 2 percent.

Del Rey soils are similar to Martinton soils and commonly are adjacent to Martinton and Milford soils on the landscape. Martinton and Milford soils have a mollic epipedon. Martinton soils are in landscape positions similar to those of the Del Rey soils. The poorly drained Milford soils are in the lower positions on the landscape.

Typical pedon of Del Rey silt loam, 0 to 2 percent slopes, 280 feet north and 20 feet east of the center of sec. 11, T. 27 N., R. 7 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; few very fine roots; few fine dark concretions of iron and manganese oxides; moderately acid; abrupt smooth boundary.

E—10 to 17 inches; light brownish gray (10YR 6/2) silt loam, white (10YR 8/1) dry; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; few very fine roots; few fine dark concretions of iron and manganese oxides; moderately acid; clear smooth boundary.

Bt—17 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium prominent grayish brown (2.5Y 5/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct white (10YR 8/1) silt coatings on faces of peds; common prominent dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg1—22 to 27 inches; grayish brown (2.5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg2—27 to 33 inches; grayish brown (2.5Y 5/2) silty clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg3—33 to 41 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few medium dark concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg4—41 to 47 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; common medium dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Cg—47 to 60 inches; grayish brown (2.5Y 5/2), stratified silty clay loam and sandy loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine dark concretions of iron and manganese oxides; neutral.

The thickness of the solum ranges from 24 to 48 inches. The Ap horizon has value of 3 or 4 and chroma of 1 or 2. The E horizon has value of 4 to 6 and chroma of 1 or 2. The Bt and C horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. The C horizon is silt loam or silty clay loam and has strata of silt loam, silty clay loam, clay loam, sandy loam, sand, or silty clay.

Drummer Series

The Drummer series consists of poorly drained, moderately permeable soils on outwash plains and till plains. These soils formed in loess and outwash. Slopes range from 0 to 2 percent.

Typical pedon of Drummer silty clay loam, 1,400 feet south and 200 feet east of the northwest corner of sec. 2, T. 25 N., R. 6 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A—10 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

BA—14 to 18 inches; dark gray (10YR 4/1) silty clay loam; few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many faint black (10YR

2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg—18 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) and few fine faint light brownish gray (2.5Y 6/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Btg1—24 to 30 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) and few fine faint light brownish gray (2.5Y 6/2) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Btg2—30 to 42 inches; grayish brown (2.5Y 5/2) silt loam; common medium prominent yellowish brown (10YR 5/6) and many medium faint light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

2Btg3—42 to 50 inches; grayish brown (2.5Y 5/2), stratified silt loam and loam; many medium prominent yellowish brown (10YR 5/6) and many medium faint light brownish gray (2.5Y 6/2) mottles; weak coarse prismatic structure; friable; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2Cg—50 to 60 inches; light brownish gray (2.5Y 6/2), stratified silt loam and loam; many coarse prominent yellowish brown (10YR 5/6) and common medium faint grayish brown (2.5Y 5/2) mottles; massive; friable; few fine dark accumulations of iron and manganese oxides on faces of peds; very slight effervescence; slightly alkaline.

The thickness of the solum ranges from 42 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has hue of 10YR or 2.5Y and chroma of 1 or 2. The B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 3. The 2B horizon is silt loam, loam, or clay loam. The 2C horizon is loam or silt loam and has strata of coarser textures.

Elliott Series

The Elliott series consists of somewhat poorly drained soils on till plains. These soils formed in loess and silty clay loam glacial till. Permeability is moderately slow in the subsoil and slow in the underlying material. Slopes range from 0 to 7 percent.

Elliott soils are similar to Clarence and Swygert soils and commonly are adjacent to Ashkum and Varna soils. The poorly drained Ashkum soils are in shallow depressions and in drainageways. Clarence and Swygert soils contain more clay throughout than the Elliott soils. The moderately well drained Varna soils are in landscape positions similar to those of the Elliott soils.

Typical pedon of Elliott silt loam, 0 to 2 percent slopes, 690 feet south and 2,436 feet west of the center of sec. 21, T. 29 N., R. 8 E.

Ap—0 to 6 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common fine roots; moderately acid; abrupt smooth boundary.

A—6 to 11 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

Bt1—11 to 16 inches; light olive brown (2.5Y 5/4) silty clay; moderate fine subangular blocky structure; friable; common fine roots; few prominent black (10YR 2/1) organic coatings on faces of peds; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt2—16 to 23 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine prominent yellowish brown (10YR 5/6) and few fine distinct grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt3—23 to 28 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt4—28 to 35 inches; olive brown (2.5Y 4/4) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few fine roots; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark

accumulations of iron and manganese oxides; few medium light-colored concretions of calcium carbonate; slight effervescence; slightly alkaline; clear smooth boundary.

2Bt5—35 to 41 inches; olive brown (2.5Y 4/4) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium angular blocky; firm; few fine roots; common prominent gray (5Y 6/1) clay films on faces of peds; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2C—41 to 60 inches; olive brown (2.5Y 4/4) silty clay loam; common fine prominent gray (5Y 5/1) mottles; massive; firm; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 45 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is silt loam or silty clay loam. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay or silty clay loam. The 2C horizon is dominantly silty clay loam, but the range includes thin strata of clay loam. This horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 4.

Graymont Series

The Graymont series consists of moderately well drained soils on till plains. These soils formed in loess and in calcareous silty clay loam glacial till. Permeability is moderate in the solum and slow in the underlying material. Slopes range from 2 to 5 percent.

Graymont soils are similar to Barrington and Saybrook soils and commonly are adjacent to Ashkum and Chenoa soils on the landscape. The poorly drained Ashkum and somewhat poorly drained Chenoa soils are in the lower positions on the landscape. They have more clay in the subsoil than the Graymont soils. Barrington soils are in landscape positions similar to those of the Graymont soils. They formed in loess and lacustrine sediments. Saybrook soils formed in loess and silt loam glacial till.

Typical pedon of Graymont silt loam, 2 to 5 percent slopes, 100 feet east and 2,100 feet north of the southwest corner of sec. 28, T. 28 N., R. 3 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

AB—7 to 12 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—12 to 19 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine angular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—19 to 24 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—24 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt4—28 to 33 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish brown (10YR 5/6) and faint light brownish gray (10YR 6/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few faint dark grayish brown (10YR 5/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

2Bt5—33 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure; firm; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2C—38 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/6) and few fine faint light brownish gray (2.5Y 6/2) mottles; massive; firm; few fine dark accumulations of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; strong effervescence; slightly alkaline.

The thickness of the solum and the depth to free carbonates range from 24 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6.

Harco Series

The Harco series consists of somewhat poorly drained, moderately permeable soils on lake plains. These soils formed in loess and calcareous silty sediments. Slopes range from 0 to 2 percent.

Harco soils are similar to Brenton and Martinton soils and commonly are adjacent to Barrington and Patton soils on the landscape. The moderately well drained Barrington soils are on adjacent side slopes. Brenton soils are on outwash plains. They contain more sand in the underlying material than the Harco soils. Martinton soils are in landscape positions similar to those of the Harco soils. They contain more clay throughout than the Harco soils. The poorly drained Patton soils are in the lower positions on the landscape.

Typical pedon of Harco silty clay loam, 2,620 feet west and 210 feet north of the southeast corner of sec. 30, T. 30 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

A—9 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine angular blocky structure parting to moderate fine granular; friable; few very fine roots; neutral; clear smooth boundary.

BA—13 to 16 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine angular blocky structure parting to moderate fine granular; friable; few very fine roots; few faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—21 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—26 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

2Bt4—31 to 35 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct grayish brown (10YR 5/2) and many fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few distinct dark grayish brown (10YR 4/2) clay films in pores; few fine dark accumulations of iron and manganese oxides; slight effervescence; slightly alkaline; clear smooth boundary.

2C1—35 to 47 inches; yellowish brown (10YR 5/6) silt loam; many medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; few fine dark accumulations of iron and manganese oxides; slight effervescence; slightly alkaline; clear smooth boundary.

2C2—47 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine dark accumulations of iron and manganese oxides; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 25 to 45 inches. The depth to free carbonates ranges from 30 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 17 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam or silty clay loam.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils in depressions on outwash plains or till plains. These soils formed in calcareous silty material and calcareous outwash or till. Slopes range from 0 to 2 percent.

Harpster soils are similar to Pella soils and commonly are adjacent to Ashkum and Drummer soils on the landscape. Ashkum soils contain more clay in the solum than the Harpster soils. Ashkum and Drummer soils do not have calcium carbonates in the solum. They are in the slightly higher positions on the landscape. Pella soils are in landscape positions similar to those of the Harpster soils. They contain less calcium carbonate throughout than the Harpster soils.

Typical pedon of Harpster silty clay loam, 120 feet north and 600 feet east of the southwest corner of sec. 12, T. 28 N., R. 3 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few fine roots; many snail shells; strong effervescence; moderately alkaline; abrupt smooth boundary.

A—10 to 16 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; few very fine roots; many snail shells; strong effervescence; moderately alkaline; abrupt smooth boundary.

Bg1—16 to 28 inches; dark gray (10YR 4/1) silty clay loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; many snail shells; violent effervescence; slightly alkaline; clear smooth boundary.

Bg2—28 to 35 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few faint dark gray (10YR 4/1) organic coatings on faces of peds; few snail shells; violent effervescence; moderately alkaline; clear smooth boundary.

Bg3—35 to 44 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; friable; very dark gray (10YR 3/1) krotovina; few snail shells; violent effervescence; moderately alkaline; clear smooth boundary.

Cg—44 to 60 inches; gray (10YR 5/1) silt loam; common medium prominent reddish brown (5YR 4/4) mottles; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 22 to 46 inches. The depth to free carbonates ranges from 0 to 16 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The Bg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6.

Hennepin Series

The Hennepin series consists of well drained, moderately slowly permeable soils on till plains. These soils formed in silt loam till. Slopes range from 12 to 35 percent.

Hennepin soils are similar to St. Clair soils and commonly are adjacent to Tuscola and Whitaker soils on the landscape. St. Clair soils are in landscape positions similar to those of the Hennepin soils. They contain more clay throughout than the Hennepin soils. Tuscola soils are less sloping than the Hennepin soils. They formed in glacial outwash. The somewhat poorly drained Whitaker soils formed in outwash. They are in the higher, more nearly level positions on the landscape.

The Hennepin soils in this survey area have less sand and more silt and clay in the control section than are defined as the range for the series.

Typical pedon of Hennepin silt loam, 12 to 20 percent slopes, 1,600 feet south and 190 feet east of the northwest corner of sec. 21, T. 29 N., R. 4 E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; slightly alkaline; clear smooth boundary.

Bw—5 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly alkaline; clear smooth boundary.

Bt1—9 to 14 inches; dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; slightly alkaline; clear smooth boundary.

Bt2—14 to 19 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; firm; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

C—19 to 60 inches; brown (10YR 5/3) silt loam; massive; firm; few pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 15 to 20 inches. The depth to free carbonates is less than 15 inches. The thickness of the mollic epipedon is less than 6 inches.

The A horizon has value of 3 or 4 and chroma of 1 or 2. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam, sandy loam, silt loam, or clay loam. The C horizon has value of 5 or 6 and chroma of 2 or 3. It is sandy loam, loam, silt loam, or clay loam.

Houghton Series

The Houghton series consists of very poorly drained soils on outwash plains and till plains. These soils formed in herbaceous organic deposits more than 51 inches thick. Permeability is moderately slow to

moderately rapid. Slopes range from 0 to 2 percent.

Houghton soils are similar to Wallkill soils and commonly are adjacent to Comfrey and Wallkill soils on the landscape. Comfrey and Wallkill soils are in the slightly higher positions on the landscape. Comfrey soils formed in loamy mineral sediments. Wallkill soils have more than 16 inches of silt loam sediments over organic sediments.

Typical pedon of Houghton muck, ponded, 1,620 feet east and 525 feet north of the southwest corner of sec. 32, T. 26 N., R. 8 E.

Oa1—0 to 10 inches; sapric material, black (N 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; weak fine subangular blocky structure; very friable; few very fine roots; neutral; clear smooth boundary.

Oa2—10 to 19 inches; sapric material, black (N 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; weak fine prismatic structure; very friable; few very fine roots; neutral; clear smooth boundary.

Oa3—19 to 27 inches; sapric material, black (N 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; weak fine prismatic structure; very friable; many fine roots; slightly acid; clear smooth boundary.

Oa4—27 to 36 inches; sapric material, black (N 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; massive; very friable; few very fine roots; slightly acid; clear smooth boundary.

Oa5—36 to 60 inches; sapric material, black (N 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; massive; very friable; few very fine roots; slightly alkaline.

The sapric material is more than 51 inches thick. Some pedons have woody fragments, which cannot be crushed between the fingers. The subsurface tiers are dominantly sapric material, but some pedons have thin strata of hemic and fibric material.

Jasper Series

The Jasper series consists of well drained, moderately permeable soils on outwash plains. These soils formed in loamy and sandy sediments. Slopes range from 0 to 10 percent.

Jasper soils are similar to Symerton and Wea soils and commonly are adjacent to La Hogue and Selma soils. The somewhat poorly drained La Hogue and poorly drained Selma soils are in the lower positions on the landscape. Symerton and Wea soils are in landscape positions similar to those of the Jasper soils. Symerton soils are underlain by glacial till. Wea soils contain more gravel in the lower part of the solum and in the underlying material than the Jasper soils.

Typical pedon of Jasper loam, 0 to 2 percent slopes, 380 feet south and 1,500 feet east of the northwest corner of sec. 17, T. 27 N., R. 5 E.

Ap—0 to 11 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—11 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—16 to 22 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bt3—22 to 30 inches; dark yellowish brown (10YR 4/4) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few medium dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bt4—30 to 38 inches; brown (10YR 4/3) sandy loam; common medium faint brown (10YR 5/3) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few medium dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

BC—38 to 47 inches; brown (10YR 4/3) sandy loam; common medium faint brown (10YR 5/3) and common medium distinct brown (7.5YR 4/4) mottles; weak medium angular blocky structure; friable; common medium dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

C1—47 to 55 inches; brown (10YR 4/3) sandy loam; common medium faint brown (10YR 5/3) and common medium distinct brown (7.5YR 4/4) mottles; single grain; very friable; common medium dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

C2—55 to 60 inches; yellowish brown (10YR 5/4) and

gray (10YR 6/1) sand; single grain; loose; few pebbles; very slight effervescence; slightly alkaline.

The thickness of the solum ranges from 30 to 48 inches. The depth to free carbonates ranges from 35 to 55 inches. The thickness of the mollic epipedon ranges from 6 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is sandy loam, sandy clay loam, loam, or clay loam. The BC and C horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. They are stratified loam, sandy loam, and sand and have 0 to 5 percent gravel.

Jasper loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series.

La Hogue Series

The La Hogue series consists of somewhat poorly drained soils on outwash plains. These soils formed in loamy sediments and stratified loamy and sandy material. Permeability is moderate in the solum and moderately rapid in the underlying material. Slopes range from 0 to 2 percent.

La Hogue soils are similar to Andres, Brenton, and Darroch soils and commonly are adjacent to Jasper and Selma soils on the landscape. Andres and Brenton soils are in landscape positions similar to those of the La Hogue soils. Andres soils are underlain by glacial till. Brenton soils contain less sand in the solum than the La Hogue soils. Darroch soils have a thinner solum than the La Hogue soils. The well drained Jasper soils are in the higher positions on the landscape. The poorly drained Selma soils are in the slightly lower positions and in drainageways.

Typical pedon of La Hogue loam, 0 to 2 percent slopes, 1,220 feet north and 60 feet west of the southeast corner of sec. 31, T. 29 N., R. 5 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

BA—11 to 16 inches; dark grayish brown (10YR 4/2) loam; few fine faint grayish brown (10YR 5/2) and few fine prominent dark brown (7.5YR 4/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 20 inches; grayish brown (10YR 5/2) clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—20 to 26 inches; grayish brown (10YR 5/2) clay loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint gray (10YR 5/1) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—26 to 33 inches; grayish brown (10YR 5/2) sandy loam; many coarse distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; very friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

BC—33 to 42 inches; grayish brown (10YR 5/2), stratified sandy loam and silt loam; many coarse distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; very friable; few very fine roots; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

C—42 to 60 inches; grayish brown (10YR 5/2), stratified loamy sand and sandy loam; many coarse distinct yellowish brown (10YR 5/6) mottles; single grain; loose; few fine dark concretions of iron and manganese oxides; slightly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The depth to free carbonates is more than 60 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. It is sandy clay loam, loam, sandy loam, or clay loam. The C horizon has hue of 7.5YR, 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 2 to 6. It has textures ranging from sand to silt loam.

La Rose Series

The La Rose series consists of well drained, moderately permeable soils on till plains. These soils formed in a thin mantle of loess and in the underlying silt loam till. Slopes range from 5 to 10 percent.

La Rose soils are similar to Hennepin and Varna soils and commonly are adjacent to Reddick and Symerton soils on the landscape. Hennepin soils have a

thinner solum than the La Rose soils. They are on the steeper side slopes. The poorly drained Reddick soils are in low, nearly level areas and in drainageways. The moderately well drained Symerton soils are on the less sloping adjacent side slopes. The moderately well drained Varna soils contain more clay in the subsoil and in the underlying material than the La Rose soils.

The La Rose soils in this survey area have a thinner dark surface layer than is defined as the range for the series.

Typical pedon of La Rose loam, 5 to 10 percent slopes, eroded, 3,600 feet east and 3,300 feet north of the southwest corner of sec. 1, T. 25 N., R. 7 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; mixed with some pockets of dark brown (10YR 4/3) silty clay loam subsoil material; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 13 inches; dark brown (10YR 4/3) silty clay loam; few fine faint brown (10YR 5/3) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct very dark grayish brown (2.5Y 3/2) clay films on faces of peds; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—13 to 18 inches; brown (10YR 5/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common distinct very dark grayish brown (2.5Y 3/2) clay films on faces of peds; slightly alkaline; clear smooth boundary.

2Bt3—18 to 24 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few distinct very dark grayish brown (2.5Y 3/2) clay films on faces of peds; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2C1—24 to 29 inches; brown (10YR 5/3) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; firm; few very fine roots; common distinct very dark grayish brown (2.5Y 3/2) pressure faces on vertical cleavage planes; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2C2—29 to 60 inches; brown (10YR 5/3) silt loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; massive; firm; few pebbles; violent effervescence; slightly alkaline.

The thickness of the solum ranges from 10 to 24 inches. The depth to free carbonates is less than 24 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has chroma of 3 or 4. Some pedons have relict mottles with chroma of 2 in the lower part of the Bt horizon. The Bt horizon is silty clay loam or clay loam. The C horizon has chroma of 3 or 4. It is silt loam or loam.

Lawson Series

The Lawson series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Lawson soils are similar to Allison soils and commonly are adjacent to Ross and Sawmill soils on the landscape. The moderately well drained Allison and well drained Ross soils are in the higher positions on the landscape. Ross soils contain more sand throughout than the Lawson soils. The poorly drained Sawmill soils are in the lower positions on the landscape.

Typical pedon of Lawson silt loam, frequently flooded, 125 feet west and 2,440 feet north of the southeast corner of sec. 29, T. 29 N., R. 4 E.

A1—0 to 16 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots; slightly alkaline; clear smooth boundary.

A2—16 to 27 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure; friable; few very fine roots; slightly alkaline; clear smooth boundary.

A3—27 to 33 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure; friable; few very fine roots; slightly alkaline; clear smooth boundary.

C1—33 to 41 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; few fine prominent dark brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; friable; few very fine roots; slightly alkaline; clear smooth boundary.

C2—41 to 51 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine prominent dark brown (7.5YR 4/4) mottles; weak fine prismatic structure; friable; few pebbles; few very fine roots; slightly alkaline; clear smooth boundary.

C3—51 to 60 inches; dark gray (10YR 4/1) silty clay loam; few fine prominent dark brown (7.5YR 4/4)

and yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; friable; few pebbles; slightly alkaline.

The thickness of the mollic epipedon is more than 30 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. The C horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3.

Lenzburg Series

The Lenzburg series consists of well drained, moderately slowly permeable soils in surface-mined areas on uplands. These soils formed in a regolith. The regolith is a mixture of fine earth material and fragments of bedrock. Slopes range from 12 to 30 percent.

Lenzburg soils are commonly adjacent to Hennepin and Starks soils. Hennepin soils formed in loamy glacial till. The somewhat poorly drained Starks soils are in nearly level positions on the landscape. They formed in loess and loamy outwash.

Typical pedon of Lenzburg silt loam, 12 to 30 percent slopes, 1,900 feet east and 590 feet north of the southwest corner of sec. 1, T. 30 N., R. 3 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; few very fine roots; slightly alkaline; clear smooth boundary.

AC—3 to 10 inches; dark brown (10YR 4/3), gray (10YR 5/1), and brown (7.5YR 4/4) loam; weak fine subangular blocky structure; firm; few very fine roots; very slight effervescence; slightly alkaline; abrupt wavy boundary

C1—10 to 18 inches; gray (10YR 5/1), yellowish brown (10YR 5/6), and brown (7.5 4/4) loam; massive with weak fine subangular blocky structure in fragments of genetic horizons; firm; few very fine roots; common pebbles; very slight effervescence; slightly alkaline; abrupt wavy boundary.

C2—18 to 31 inches; gray (10YR 5/1) and brown (7.5YR 4/4) loam; massive with weak fine subangular blocky structure in fragments of genetic horizons; firm; few very fine roots; about 10 percent, by volume, till pebbles and siltstone channers; very slight effervescence; slightly alkaline; abrupt wavy boundary.

C3—31 to 38 inches; gray (10YR 5/1) and brown (7.5YR 4/4) loam; massive with weak fine subangular blocky structure in fragments of genetic horizons; firm; few very fine roots; about 20 percent, by volume, till pebbles and siltstone channers; neutral; abrupt wavy boundary.

C4—38 to 60 inches; dark grayish brown (10YR 4/2), dark brown (7.5YR 4/4), and gray (10YR 5/1) loam; massive with weak fine subangular blocky structure in fragments of genetic horizons; firm; few very fine roots; about 25 percent, by volume, till pebbles, siltstone channers, and black refuse material; neutral.

The fine earth material has a few fragments of genetic horizons. The rock fragments are commonly soft shale and siltstone, but some are sandstone or limestone. The content of rock fragments in the control section ranges from 10 to 35 percent, by volume. Most of the fragments range from 2 millimeters to 15 centimeters in diameter, but some are much larger stones and boulders.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 1 to 4. It is channery loam, loam, clay loam, silt loam, or silty clay loam. The content of rock fragments in this horizon ranges from 0 to 25 percent, by volume. A few stones are on the surface. The C horizon has hue of 10YR, 2.5Y, 5Y, or 5G or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 6. Many of the colors are relict and are not indicative of soil drainage. The C horizon is loam, silt loam, silty clay loam, silty clay, or the channery or gravelly analogs of these textures. The content of rock fragments in this horizon ranges from 15 to 35 percent, by volume.

Lisbon Series

The Lisbon series consists of somewhat poorly drained soils on till plains. These soils formed in 20 to 40 inches of loess and calcareous, silt loam till. Permeability is moderate in the loess and moderately slow in the underlying glacial till. Slopes range from 0 to 2 percent.

Lisbon soils are similar to Andres and Elliott soils and commonly are adjacent to Saybrook and Drummer soils on the landscape. Andres soils are fine-loamy. They are in landscape positions similar to those of the Lisbon soils. The poorly drained Drummer soils are lower on the landscape than the Lisbon soils. Elliott soils contain more clay throughout than the Lisbon soils. The moderately well drained Saybrook soils are in the higher positions on the landscape.

Typical pedon of Lisbon silt loam, 2,820 feet north and 220 feet west of the southeast corner of sec. 3, T. 25 N., R. 6 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few fine roots; moderately acid; abrupt smooth boundary.

A—8 to 13 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine subangular

blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—13 to 17 inches; dark brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—17 to 22 inches; dark brown (10YR 4/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—22 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bt4—29 to 37 inches; brown (10YR 5/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2Btk—37 to 41 inches; light olive brown (2.5Y 5/4) silt loam; few fine prominent yellowish brown (10YR 5/6) and few fine prominent light gray (10YR 6/1) mottles; weak medium prismatic structure; friable; few very fine roots; few prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2C—41 to 60 inches; light olive brown (2.5Y 5/4) silt loam; few fine prominent yellowish brown (10YR 5/6) and few fine prominent light gray (10YR 6/1) mottles; massive; friable; few fine dark concretions of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; few pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 24 to 42 inches. The depth to free carbonates ranges from 20 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt and 2B horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. The 2B horizon is silt loam, loam, or clay loam. The 2C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6.

Martinton Series

The Martinton series consists of somewhat poorly drained, moderately slowly permeable soils on lake plains. These soils formed in lacustrine sediments. Slopes range from 0 to 5 percent.

Martinton soils are similar to Chenoa soils and commonly are adjacent to Del Rey and Milford soils on the landscape. Chenoa soils formed in loess and silty clay loam glacial till. Del Rey soils contain less organic matter in the surface layer than the Martinton soils. The poorly drained Milford soils are in the lower positions on the landscape.

Typical pedon of Martinton silt loam, 0 to 2 percent slopes, 160 feet west and 425 feet north of the southeast corner of sec. 5, T. 27 N., R. 7 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings; slightly acid; abrupt smooth boundary.

A—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

BA—12 to 19 inches; dark brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/2) mottles; moderate fine angular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—19 to 27 inches; dark grayish brown (10YR 4/2) silty clay; few fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; common distinct very dark grayish brown (2.5Y 3/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—27 to 39 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium distinct light olive brown (2.5Y 5/4) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure

parting to moderate fine angular blocky; firm; few very fine roots; common faint very dark grayish brown (2.5Y 3/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

BC—39 to 46 inches; grayish brown (2.5Y 5/2) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; very slight effervescence; neutral; clear smooth boundary.

C—46 to 60 inches; grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6), stratified silty clay loam and sandy loam; massive; very friable; few fine dark concretions of iron and manganese oxides; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 30 to 50 inches. The depth to free carbonates is more than 35 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 4. It is silty clay loam or silty clay. The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 6. It is commonly silty clay loam, but the range includes silt loam, sandy loam, and silty clay.

Milford Series

The Milford series consists of poorly drained, moderately slowly permeable soils on glacial lake plains. These soils formed in silty or clayey lacustrine sediments. Slopes range from 0 to 2 percent.

Milford soils are similar to Ashkum and Bryce soils and commonly are adjacent to Ashkum and Martinton soils on the landscape. Ashkum soils are underlain by silty clay loam glacial till. Bryce soils have more clay in the subsoil than the Milford soils and are underlain by silty clay and clay glacial till. The somewhat poorly drained Martinton soils are in the higher positions on the landscape.

Typical pedon of Milford silty clay loam, 100 feet west and 150 feet south of the northeast corner of sec. 24, T. 27 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—9 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; blocky fragments from traffic pan; neutral; clear smooth boundary.

AB—14 to 21 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

Bg1—21 to 25 inches; dark gray (10YR 4/1) silty clay; moderate fine subangular blocky structure; friable; few fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common faint very dark gray (10YR 3/1) pressure faces on vertical faces of peds; neutral; clear smooth boundary.

Bg2—25 to 30 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common faint very dark grayish brown (2.5Y 3/2) pressure faces on vertical faces of peds; neutral; clear smooth boundary.

Bg3—30 to 36 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; friable; few fine roots; few faint very dark grayish brown (2.5Y 3/2) organic coatings on faces of peds; common faint dark grayish brown (2.5Y 4/2) pressure faces on vertical faces of peds; neutral; clear smooth boundary.

BCg—36 to 43 inches; grayish brown (2.5Y 5.2) silty clay loam stratified with thin bands of clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few fine roots; few faint very dark grayish brown (2.5Y 3/2) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Cg—43 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam stratified with thin bands of clay loam; many medium distinct yellowish brown (10YR 5/1) mottles; massive; firm; black (10YR 2/1) krotovina 1 inch thick; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral.

The thickness of the solum ranges from 36 to 60 inches. The thickness of the mollic epipedon ranges from 12 to 24 inches.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is

silty clay, silty clay loam, or clay loam. The C horizon is silty clay, silty clay loam, clay loam, or clay and commonly contains strata of other textures.

Mokena Series

The Mokena series consists of somewhat poorly drained soils on till plains. These soils formed in glacial outwash and silty clay glacial till. Permeability is moderately slow in the upper part of the solum and very slow in the lower part of the solum and in the underlying material. Slopes range from 0 to 2 percent.

Mokena soils are similar to Andres and Swygert soils and commonly are adjacent to Bryce and Swygert soils on the landscape. The poorly drained Bryce soils are in the lower positions on the landscape. Andres and Swygert soils are in landscape positions similar to those of the Mokena soils. Andres soils contain less clay in the lower part of the solum and in the underlying material than the Mokena soils, and Swygert soils contain more clay in the subsoil.

Typical pedon of Mokena silt loam, 0 to 2 percent slopes, 600 feet east and 900 feet north of the southwest corner of sec. 33, T. 29 N., R. 5 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—10 to 15 inches; dark brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—15 to 20 inches; dark brown (10YR 4/3) clay loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bt3—20 to 25 inches; dark brown (10YR 4/3) sandy loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions of iron and manganese oxides; slightly acid; gradual smooth boundary.

Bt4—25 to 35 inches; dark grayish brown (10YR 4/2) sandy clay loam; common medium faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; gradual smooth boundary.

2BC—35 to 39 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct gray (2.5Y 6/0) and light olive brown (2.5Y 5/6) mottles; weak coarse prismatic structure; firm; few fine dark concretions of iron and manganese oxides; neutral; gradual smooth boundary.

2C—39 to 60 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct gray (2.5Y 6/0) and light olive brown (2.5Y 5/6) mottles; massive; firm; few fine dark concretions of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 36 to 55 inches. The depth to free carbonates ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The lower part of the Bt horizon is sandy clay loam, loam, sandy loam, or fine sandy loam. The C horizon is silty clay or clay.

Mona Series

The Mona series consists of moderately well drained soils on till plains. These soils formed in loess and loamy outwash and silty clay glacial till. Permeability is moderately slow in the loess and outwash sediments and very slow in the glacial till. Slopes range from 2 to 10 percent.

Mona soils are similar to Symerton and Wenona soils and commonly are adjacent to Mokena and Reddick soils on the landscape. The somewhat poorly drained Mokena and poorly drained Reddick soils are in the lower positions on the landscape. Symerton soils contain less clay in the underlying material than the Mona soils. Wenona soils formed in loess and loamy lacustrine sediments.

The Mona soils in this survey area have a thinner dark surface layer than is defined as the range for the series.

Typical pedon of Mona silt loam, 2 to 5 percent

slopes, eroded, 60 feet north and 2,420 feet west of the southeast corner of sec. 24, T. 30 N., R. 6 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with pockets of dark yellowish brown (10YR 4/4) clay loam subsoil material; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few pebbles; moderately acid; clear smooth boundary.

Bt2—16 to 21 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; moderately acid; clear smooth boundary.

Bt3—21 to 31 inches; dark yellowish brown (10YR 4/4) clay loam; common fine distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few fine distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2BCk—31 to 36 inches; light olive brown (2.5Y 5/4) silty clay; few medium prominent light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few fine light-colored concretions of calcium carbonate; few fine dark accumulations of iron and manganese oxides; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2C—36 to 60 inches; light olive brown (2.5Y 5/4) silty clay; common medium prominent gray (10YR 6/1) and common fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine light-colored concretions of calcium carbonate; few fine dark accumulations of iron and manganese oxides; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 50 inches. The depth to free carbonates ranges from 30 to 54 inches. The thickness of the mollic epipedon ranges from 6 to 10 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The B or 2B horizon has value of 4 to 6 and chroma of 3 or 4. It is silty clay loam, clay loam, or sandy clay loam. The BC, 2BC, 2C, and 3C horizons, if they occur, have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. They are silty clay or clay.

Monee Series

The Monee series consists of poorly drained, very slowly permeable soils on till plains. These soils formed in colluvial sediments and silty clay or clay glacial till. Slopes range from 0 to 2 percent.

Monee soils are similar to Rowe soils and commonly are adjacent to Clarence, Nappanee, and Rowe soils on the landscape. The somewhat poorly drained Clarence and Nappanee soils are in the higher positions on the landscape. Nappanee soils contain less organic matter in the surface layer than the Monee soils. Clarence and Rowe soils do not have an E horizon. Rowe soils are in landscape positions similar to those of the Monee soils.

Typical pedon of Monee silt loam, 690 feet west and 60 feet south of the northeast corner of sec. 34, T. 30 N., R. 4 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E—9 to 16 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) and few fine prominent brown (7.5YR 4/4) mottles; weak thin platy structure; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Btg1—16 to 20 inches; gray (5Y 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine angular blocky structure; firm; few very fine roots; few prominent very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

2Btg2—20 to 25 inches; gray (5Y 5/1) silty clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Btg3—25 to 32 inches; gray (5Y 5/1) silty clay; common medium prominent light olive brown (2.5Y 5/4) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; common faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Btg4—32 to 38 inches; gray (5Y 5/1) silty clay; many medium prominent light olive brown (2.5Y 5/4) mottles; moderate fine prismatic structure parting to

weak fine angular blocky; firm; few faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; common fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2BCg—38 to 47 inches; gray (5Y 5/1) silty clay; many medium prominent light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure; firm; few fine dark concretions of iron and manganese oxides; slightly alkaline; clear smooth boundary.

2Cg—47 to 60 inches; gray (5Y 5/1) silty clay; many medium prominent light olive brown (2.5Y 5/4) mottles; massive; firm; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 30 to 60 inches. The depth to free carbonates ranges from 24 to 60 inches. The thickness of the mollic epipedon ranges from 7 to 10 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 to 6 and chroma of 1 or 2. It is silt loam or silty clay loam. The B, 2B, and 2BC horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have value of 4 to 6 and chroma of 0 to 2. They are silty clay, clay, or silty clay loam. The 2C horizon has hue of 2.5Y or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2.

Nappanee Series

The Nappanee series consists of somewhat poorly drained, very slowly permeable soils on till plains. These soils formed in loess and silty clay till. Slopes range from 0 to 9 percent.

Nappanee soils are similar to Blount and Del Rey soils and commonly are adjacent to Clarence and Rowe soils on the landscape. Blount soils contain less clay throughout than the Nappanee soils. Clarence soils have a mollic epipedon. They are in landscape positions similar to those of the Nappanee soils. Del Rey soils formed in lacustrine sediments. The poorly drained Rowe soils are in the lower positions on the landscape.

Typical pedon of Nappanee silt loam, 0 to 2 percent slopes, 1,950 feet east and 10 feet north of the center of sec. 2, T. 29 N., R. 4 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

A/E—8 to 13 inches; dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) silt loam, white (10YR 8/1) dry; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; few very fine roots; moderately acid; abrupt smooth boundary.

2Btg1—13 to 18 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine prominent yellowish brown (10YR 5/6) and few fine faint grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few faint very dark grayish brown (2.5Y 3/2) clay films on faces of peds; moderately acid; clear smooth boundary.

2Btg2—18 to 23 inches; grayish brown (2.5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) and common fine faint grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.

2Btg3—23 to 33 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/6) and common fine faint grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to weak fine angular blocky; firm; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few medium dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2C—33 to 60 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct light olive brown (2.5Y 5/4) and many coarse distinct gray (5Y 5/1) mottles; massive; very firm; few medium dark concretions of iron and manganese oxides; slight effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 18 to 40 inches. The thickness of the mollic epipedon ranges from 0 to 5 inches.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. It is silt loam or loam. The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is silty clay loam or silty clay. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay loam, silty clay, or clay.

Onarga Series

The Onarga series consists of moderately well drained soils on outwash plains and stream terraces. These soils formed in eolian loams and in the underlying stratified outwash. Permeability is moderate in the solum and rapid in the underlying material. Slopes range from 1 to 10 percent.

Onarga soils are similar to Alvin and Jasper soils and commonly are adjacent to Ridgeville and Selma soils on the landscape. The moderately well drained Alvin soils have less organic matter in the surface layer than the

Onarga soils. The well drained Jasper soils are fine-loamy. The somewhat poorly drained Ridgeville soils are in the lower positions on the landscape. The poorly drained Selma soils are fine-loamy. They are in the lower positions on the landscape.

Typical pedon of Onarga fine sandy loam, 1 to 5 percent slopes, 2,150 feet north and 1,080 feet west of the southeast corner of sec. 2, T. 25 N., R. 7 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; few fine roots; moderately acid; abrupt smooth boundary.

A—8 to 17 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—17 to 23 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; few faint dark brown (10YR 3/3) clay films on faces of peds; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—23 to 31 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; few faint dark brown (10YR 3/3) clay films on faces of peds; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

BC—31 to 41 inches; yellowish brown (10YR 5/4) loamy fine sand; few fine distinct grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; very friable; few fine roots; few distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

C—41 to 60 inches; stratified, dark yellowish brown (10YR 4/6) loam and loamy sand; many medium distinct grayish brown (10YR 5/2) and few fine prominent dark brown (7.5YR 4/4) mottles; single grain; loose; few fine dark accumulations of iron and manganese oxides; slightly acid.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 5. It is loam or fine sandy loam. Some pedons have thin layers of sandy clay loam. The C horizon is stratified loamy sand, sandy loam, loam, and silt loam. It has hue of 10YR or 7.5YR and value and chroma of 4 to 6.

Patton Series

The Patton series consists of poorly drained soils on lake plains. These soils formed in loess and calcareous silty sediments. Permeability is moderate in the upper part and moderately slow in the lower part. Slopes range from 0 to 2 percent.

Patton soils are similar to Drummer soils and commonly are adjacent to Barrington and Harco soils on the landscape. The moderately well drained Barrington soils are on adjacent side slopes. The somewhat poorly drained Harco soils are in the slightly higher positions on the landscape. Drummer soils contain more sand in the lower part of the subsoil and in the underlying material than the Patton soils.

Typical pedon of Patton silty clay loam, 1,300 feet east and 1,220 feet north of the southwest corner of sec. 30, T. 30 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; clear smooth boundary.

Btg1—14 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg2—20 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Btg3—25 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few medium dark accumulations of iron and manganese oxides; slightly alkaline; clear smooth boundary.

Btg4—29 to 33 inches; olive gray (5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine angular blocky; friable; few very

fine roots; common faint olive gray (5Y 4/2) clay films on faces of peds; few medium dark accumulations of iron and manganese oxides; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2Btg5—33 to 41 inches; olive gray (5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few faint olive gray (5Y 4/2) clay films on faces of peds; few medium dark accumulations of iron and manganese oxides; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2Cg—41 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few very fine roots; common faint grayish brown (2.5Y 5/2) coatings on vertical cleavage planes; few medium dark accumulations of iron and manganese oxides; few pebbles; strong effervescence; slightly alkaline.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The B horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. The C horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2.

Pella Series

The Pella series consists of poorly drained, moderately permeable soils on outwash plains. These soils formed in loess and loamy outwash. Slopes range from 0 to 2 percent.

Pella soils are similar to Drummer and Patton soils and commonly are adjacent to Patton soils on the landscape. Drummer soils are in the slightly higher positions. They do not have free carbonates above a depth of 40 inches. Patton soils are in the higher positions on the landscape. They are deeper to carbonates than the Pella soils.

Typical pedon of Pella silty clay loam, 657 feet west and 114 feet south of the northeast corner of sec. 1, T. 28 N., R. 3 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A—10 to 14 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg—14 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/6) mottles; moderate fine subangular blocky structure; friable; few faint light olive brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Btkg1—20 to 27 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; many coarse light-colored concretions of calcium carbonate; violent effervescence; moderately alkaline; clear smooth boundary.

2Btkg2—27 to 30 inches; light olive gray (5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; very few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; many coarse light-colored concretions of calcium carbonate; violent effervescence; moderately alkaline; clear smooth boundary.

2Bkg—30 to 36 inches; gray (5Y 6/1) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; common coarse light-colored concretions of calcium carbonate; strong effervescence; slightly alkaline; clear smooth boundary.

2BCkg—36 to 44 inches; gray (5Y 6/1), stratified silt loam and fine sandy loam; many coarse prominent light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; friable; very dark gray (10YR 3/1), vertical krotovina; common medium light-colored concretions of calcium carbonate; strong effervescence; slightly alkaline; clear smooth boundary.

2Cg—44 to 60 inches; gray (5Y 6/1), stratified fine sandy loam and silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 32 to 48 inches. The depth to free carbonates ranges from 16 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 22 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to

2. It is clay loam or silty clay loam. The 2BC and 2C horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have value of 5 or 6 and chroma of 0 to 6. They are loam, clay loam, silt loam, or sandy loam.

Peotone Series

The Peotone series consists of very poorly drained, moderately slowly permeable soils in depressions on till plains. These soils formed in silty and clayey local sediments from adjacent slopes. Slopes range from 0 to 2 percent.

Peotone soils are similar to Rantoul soils and commonly are adjacent to Ashkum soils. Ashkum soils are in the higher positions on the landscape. They have a mollic epipedon that is less than 24 inches thick. Rantoul soils contain more clay in the solum than the Peotone soils.

Typical pedon of Peotone silty clay loam, 100 feet west and 1,140 feet north of the southeast corner of sec. 29, T. 27 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—9 to 18 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; clear smooth boundary.

AB—18 to 29 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak fine prismatic structure parting to moderate fine angular blocky; firm; few fine roots; neutral; clear smooth boundary.

Bg1—29 to 36 inches; dark gray (5Y 4/1) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few fine roots; common prominent black (10YR 2/1) organic coatings on faces of peds; few faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; one pebble 10 millimeters in diameter; slightly alkaline; clear smooth boundary.

Bg2—36 to 43 inches; olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few fine roots; few faint gray (5Y 5/1) pressure faces on vertical faces of peds; few fine dark accumulations of iron and manganese oxides; black (10YR 2/1) krotovina 1 inch thick; slight effervescence; slightly alkaline; clear smooth boundary.

Bg3—43 to 52 inches; olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; few faint gray (5Y 5/1) pressure faces on vertical faces of peds; few fine light-colored concretions of calcium carbonate; black (10YR 2/1) krotovina 2 inches thick; slight effervescence; slightly alkaline; clear smooth boundary.

Bg4—52 to 60 inches; gray (5Y 5/1) silty clay; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; few fine light-colored concretions of calcium carbonate; black (10YR 2/1) krotovina 1 inch thick; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 38 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has chroma of 0 to 2. It has value of 2 or 3 in the upper part and 4 or 5 in the lower part. It is silty clay loam or silty clay.

Proctor Series

The Proctor series consists of moderately well drained, moderately permeable soils on outwash plains. These soils formed in loess and loamy outwash. Slopes range from 2 to 5 percent.

Proctor soils are similar to Barrington soils and commonly are adjacent to Brenton and Drummer soils on the landscape. Barrington soils formed in loess and calcareous silty lacustrine sediments. The somewhat poorly drained Brenton and poorly drained Drummer soils are in the lower positions on the landscape.

Typical pedon of Proctor silt loam, 2 to 5 percent slopes, 2,320 feet north and 290 feet west of the center of sec. 14, T. 34 N., R. 6 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; moderately acid; clear smooth boundary.

AB—10 to 15 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; gradual smooth boundary.

Bt1—15 to 19 inches; dark brown (7.5YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; common distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—19 to 25 inches; dark brown (7.5YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; many distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt3—25 to 36 inches; dark brown (7.5YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; many distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt4—36 to 40 inches; dark brown (7.5YR 4/4) silty clay loam; weak medium subangular blocky structure; firm; many faint distinct dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2BC—40 to 45 inches; dark brown (7.5YR 4/2 and 4/4) clay loam; weak medium subangular blocky structure; very firm; slightly acid; clear smooth boundary.

2C—45 to 60 inches; dark brown (10YR 4/3) sandy loam; massive; friable; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The A horizon has value and chroma of 2 or 3. The Bt horizon has value of 3 to 5 in the upper part and 4 to 6 in the lower part. The 2BC and 2C horizons have hue of 2.5Y, 10YR, or 7.5YR, value of 4 to 6, and chroma of 2 to 6. They are stratified.

Rantoul Series

The Rantoul series consists of very poorly drained, very slowly permeable soils in depressions on till plains. These soils formed in local sediments from adjacent slopes and in silty clay glacial till or lakebed sediments. Slopes range from 0 to 2 percent.

Rantoul soils are similar to Peotone soils and commonly are adjacent to Bryce and Rowe soils on the landscape. Bryce and Rowe soils are in nearly level areas above the Rantoul soils. They have a thinner mollic epipedon than the Rantoul soils. Bryce and Peotone soils contain less clay in the solum than the Rantoul soils.

Typical pedon of Rantoul silty clay, 1,612 feet east and 111 feet south of the northwest corner of sec. 29, T. 30 N., R. 7 E.

Ap—0 to 8 inches; black (N 2/0) silty clay, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; few very fine roots; neutral; abrupt smooth boundary.

A—8 to 17 inches; black (N 2/0) silty clay, dark gray (10YR 4/1) dry; moderate medium granular structure; firm; few very fine roots; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Bg1—17 to 26 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; few coarse prominent olive (5Y 4/3) and common fine prominent yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to strong fine and medium angular blocky; firm; few very fine roots; many distinct black (N 2/0) organic coatings on faces of peds; few pebbles; neutral; clear smooth boundary.

Bg2—26 to 31 inches; dark gray (5Y 4/1) silty clay; common fine and medium prominent light olive brown (2.5Y 5/6) and yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to strong medium angular blocky; firm; many faint very dark gray (5Y 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bg3—31 to 40 inches; gray (5Y 5/1) silty clay; few fine prominent light olive brown (2.5Y 5/6) mottles; strong medium prismatic structure parting to strong medium angular blocky; firm; few very fine roots; few prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bg4—40 to 47 inches; mottled dark gray (5Y 4/1) and gray (5Y 5/1) silty clay; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium and coarse prismatic structure parting to moderate medium and coarse angular blocky; firm; few very fine roots; common faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

BCg—47 to 60 inches; mottled gray (5Y 5/1) and yellowish brown (10YR 5/6) silty clay; weak coarse prismatic structure parting to weak coarse angular blocky; very firm; common faint dark gray (5Y 4/1) pressure faces on vertical faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral.

The thickness of the solum ranges from 36 to more than 60 inches. The depth to free carbonates ranges from 34 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Bg horizon has hue of 5Y or 2.5Y or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 2. It is silty clay

or clay. The Cg horizon has hue of 10YR or 2.5Y. It is silty clay loam, silty clay, or clay.

Reddick Series

The Reddick series consists of poorly drained soils on till plains. These soils formed in loamy sediments and glacial till. Permeability is moderate in the loamy sediments and slow in the glacial till. Slopes range from 0 to 2 percent.

Reddick soils are similar to Selma and Westland soils and commonly are adjacent to Andres and Symerton soils on the landscape. The somewhat poorly drained Andres soils are in the slightly higher positions on the landscape. Selma and Westland soils are in landscape positions similar to those of the Reddick soils. Selma soils formed entirely in loamy sediments. Westland soils formed in loamy sediments and gravel. The moderately well drained Symerton soils are in the more sloping, higher positions.

Typical pedon of Reddick clay loam, 153 feet west and 147 feet south of the northeast corner of sec. 29, T. 30 N., R. 8 E.

Ap—0 to 11 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

Btg1—11 to 15 inches; dark grayish brown (2.5Y 4/2) clay loam; few fine distinct olive brown (2.5Y 4/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg2—15 to 20 inches; grayish brown (2.5Y 5/2) clay loam; few fine distinct olive brown (2.5Y 4/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly alkaline; clear smooth boundary.

Btg3—20 to 26 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly alkaline; clear smooth boundary.

Btg4—26 to 33 inches; grayish brown (2.5Y 5/2) clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Btg5—33 to 41 inches; gray (N 6/0) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; common prominent grayish brown (2.5Y 5/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Btg6—41 to 52 inches; gray (5Y 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; firm; few very fine roots; common distinct gray (N 5/0) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; common pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2C—52 to 60 inches; gray (5Y 5/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine dark concretions of iron and manganese oxides; common pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 35 to 55 inches. The depth to free carbonates is slightly less than the thickness of the solum. The thickness of the mollic epipedon ranges from 10 to 22 inches.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Btg horizon has hue of 2.5Y or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is clay loam or silty clay loam. The 2C horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 6. It is commonly silty clay loam, but the range includes silty clay.

Ridgeville Series

The Ridgeville series consists of somewhat poorly drained soils on outwash plains and stream terraces. These soils formed in stratified loamy and sandy outwash. Permeability is moderate in the upper part of the solum and moderately rapid in the lower part of the solum and in the underlying material. Slopes range from 0 to 2 percent.

Ridgeville soils are similar to Crane and La Hogue soils and commonly are adjacent to Onarga and Selma soils on the landscape. Crane and La Hogue soils are in landscape positions similar to those of the Ridgeville soils. They contain more clay in the control section than the Ridgeville soils. Crane soils contain gravel in the underlying material. The moderately well drained Onarga soils are in the higher positions on the landscape. The poorly drained Selma soils contain more

clay throughout than the Ridgeville soils. They are in the lower positions on the landscape.

Typical pedon of Ridgeville fine sandy loam, 0 to 2 percent slopes, 2,080 feet north and 75 feet west of the southeast corner of sec. 2, T. 25 N., R. 7 E.

Ap—0 to 9 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; moderate fine granular structure; very friable; few very fine roots; neutral; abrupt smooth boundary.

A—9 to 16 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; very friable; few very fine roots; neutral; clear smooth boundary.

Bt1—16 to 21 inches; dark brown (10YR 4/3) fine sandy loam; few fine faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; very friable; few very fine roots; few distinct very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 27 inches; brown (10YR 5/3) fine sandy loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; few very fine roots; few faint very dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg1—27 to 34 inches; grayish brown (10YR 5/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; very friable; few very fine roots; few faint brown (10YR 5/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg2—34 to 41 inches; grayish brown (10YR 5/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; very friable; common faint gray (10YR 5/1) clay films on faces of peds; slightly acid; clear smooth boundary.

BCg—41 to 49 inches; grayish brown (10YR 5/2) loamy fine sand; many medium distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; loose; neutral; clear smooth boundary.

Cg—49 to 60 inches; grayish brown (10YR 5/2) loamy fine sand that has some strata; many medium distinct yellowish brown (10YR 5/6) mottles; single grain; neutral.

The thickness of the solum ranges from 40 to 55 inches. The depth to free carbonates is 40 to more than 60 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 2 to 4. It is commonly fine sandy loam, but the range includes sandy loam or sandy clay loam. The BC and C horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. They are loamy fine sand, loamy sand, or sand and contain strata of loam and sandy loam.

Rockton Series

The Rockton series consists of well drained, moderately permeable soils on hills. These soils formed in loamy sediments over dolomitic limestone. Slopes range from 0 to 2 percent.

Rockton soils are similar to Jasper soils and commonly are adjacent to Jasper and La Hogue soils on the landscape. Jasper soils and the somewhat poorly drained La Hogue soils formed in more than 60 inches of loamy and sandy sediments. Jasper soils are in landscape positions similar to those of the Rockton soils. La Hogue soils are in the slightly lower positions on the landscape.

Typical pedon of Rockton silt loam, 0 to 2 percent slopes, 2,600 feet east and 550 feet north of the southwest corner of sec. 19, T. 27 N., R. 6 E.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

BA—11 to 16 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 22 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—22 to 28 inches; brown (7.5YR 4/4) clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common distinct dark brown (7.5YR 3/2) clay films on faces of peds; few pebbles; slightly acid; clear smooth boundary.

Bt3—28 to 35 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (7.5YR 3/2) clay films on faces of peds; common pebbles; slightly acid; clear smooth boundary.

2R—35 to 60 inches; white (10YR 8/2) bedrock; massive.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. The B horizon has value of 4 or 5 and chroma of 3 or 4. Some pedons have a 2B horizon. This horizon is 1 to 5 inches thick. It is silty clay or clay.

Rooks Series

The Rooks series consists of somewhat poorly drained soils on till plains. These soils formed in loess and calcareous, silty lacustrine sediments and silty clay loam glacial till. Permeability is moderate in the solum and slow in the underlying material. Slopes range from 0 to 2 percent.

Rooks soils are similar to Chenoa soils and commonly are adjacent to Ashkum and Graymont soils on the landscape. Chenoa soils are in landscape positions similar to those of the Rooks soils. They contain more clay in the subsoil than the Rooks soils. The poorly drained Ashkum soils are in the lower positions on the landscape. The moderately well drained Graymont soils are in the higher positions on the landscape.

Typical pedon of Rooks silty clay loam, 390 feet east and 2,350 feet south of the northwest corner of sec. 18, T. 29 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; moderate fine roots; neutral; abrupt smooth boundary.

A—9 to 15 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few very fine roots; many faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—15 to 22 inches; dark brown (10YR 4/3) silty clay loam; common fine faint grayish brown (10YR 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—22 to 30 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

2Btk1—30 to 38 inches; grayish brown (10YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few faint gray (10YR 5/1) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; common fine light-colored concretions of calcium carbonate; slight effervescence; slightly alkaline; gradual smooth boundary.

2Btk2—38 to 45 inches; gray (10YR 6/1) and yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure; friable; common faint gray (10YR 5/1) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; common fine light-colored concretions of calcium carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

3BCk—45 to 51 inches; grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) silty clay loam; weak medium prismatic structure; firm; common distinct gray (10YR 5/1) pressure faces on vertical faces of peds; common medium light-colored concretions of calcium carbonate; few pebbles; strong effervescence; moderately alkaline; clear smooth boundary.

3C—51 to 60 inches; grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) silty clay loam; massive; firm; many distinct gray (2.5Y 5/0) pressure faces on vertical cleavage planes; common pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 55 inches. The depth to free carbonates ranges from 30 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 17 inches.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or more, and chroma of 2 to 4. It is silt loam or silty clay loam. The 2Bt horizon has value of 4 to 6 and chroma of 1 to 6. The 3C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 6.

Ross Series

The Ross series consists of well drained soils on flood plains. These soils formed in loamy alluvium. Permeability is moderate in the upper part and moderately rapid in the lower part. Slopes range from 0 to 2 percent.

Ross soils are similar to Allison and Jasper soils and commonly are adjacent to Comfrey and Lawson soils on the landscape. Allison soils are in landscape positions similar to those of the Ross soils. They contain less sand in the control section than the Ross soils. The poorly drained Comfrey soils are in low positions on the landscape. Jasper soils are on outwash plains and

stream terraces. They are not cumulic. The somewhat poorly drained Lawson soils contain less sand in the control section than the Ross soils. They are in the slightly lower positions on the landscape.

Typical pedon of Ross loam, frequently flooded, 2,030 feet east and 550 feet north of the southwest corner of sec. 7, T. 30 N., R. 4 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A1—8 to 14 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate medium granular; friable; few very fine roots; neutral; clear smooth boundary.

A2—14 to 23 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; few very fine roots; many faint very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BA—23 to 33 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine prismatic structure parting to weak medium angular blocky; friable; few very fine roots; common faint very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw1—33 to 41 inches; dark brown (10YR 4/3) loam; weak fine prismatic structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw2—41 to 54 inches; dark brown (10YR 4/3) loam; few fine distinct yellowish brown (10YR 5/6) and few medium faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure; friable; few faint dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

C—54 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam; few fine distinct yellowish brown (10YR 5/6) and few medium distinct grayish brown (10YR 5/2) mottles; massive; friable; few fine dark accumulations of iron and manganese oxides; slightly acid.

The thickness of the solum ranges from 30 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 40 inches. The mollic epipedon extends into the B horizon in most pedons.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bw horizon has value of 2 to 4 and chroma of 1 to 4. It is commonly loam or silt loam, but the range includes sandy loam. The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is sandy loam, loam, or silt loam.

Rowe Series

The Rowe series consists of poorly drained, very slowly permeable soils on till plains. These soils formed in lacustrine sediments and calcareous, silty clay glacial till. Slopes range from 0 to 2 percent.

Rowe soils are similar to Bryce and Milford soils and commonly are adjacent to Clarence soils. Bryce and Milford soils are in landscape positions similar to those of the Rowe soils. Bryce soils contain less clay in the control section than the Rowe soils. Milford soils formed in lakebed sediments. The somewhat poorly drained Clarence soils are in the higher positions on the landscape.

Typical pedon of Rowe silty clay, 1,300 feet west and 800 feet north of the southeast corner of sec. 17, T. 30 N., R. 5 E.

Ap—0 to 11 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

BA—11 to 16 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few distinct dark gray (5Y 4/1) clay films on faces of peds; common distinct black (10YR 2/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

2Btg1—16 to 27 inches; gray (5Y 5/1) silty clay; common fine prominent light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark gray (5Y 4/1) clay films on faces of peds; few prominent black (10YR 2/1) organic coatings in pores; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; gradual smooth boundary.

2Btg2—27 to 36 inches; gray (5Y 5/1) silty clay; common fine prominent light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; few faint dark gray (5Y 4/1) clay films on vertical faces of peds; few prominent black (10YR 2/1) organic coatings in pores; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; gradual smooth boundary.

2BCg—36 to 45 inches; gray (5Y 5/1) silty clay; many

medium prominent light olive brown (2.5Y 5/6) mottles; weak coarse prismatic structure; firm; few very fine roots; few fine faint dark gray (5Y 4/1) clay films on vertical faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; very slight effervescence; slightly alkaline; clear smooth boundary.

2Cg—45 to 60 inches; gray (5Y 5/1) silty clay; many moderate prominent olive brown (2.5Y 4/4) mottles; massive; firm; few fine dark accumulations of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 35 to 50 inches. The depth to free carbonates ranges from 35 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 22 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The 2Btg horizon has hue of 2.5Y or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is silty clay or clay. The 2BCg and 2Cg horizons have hue of 2.5Y or 5Y or are neutral in hue. They have value of 4 to 6 and chroma of 0 to 6. They are silty clay or clay.

Rutland Series

The Rutland series consists of somewhat poorly drained soils on till plains. These soils formed in loess and silty clay glacial till. Permeability is moderately slow in the upper part of the solum and slow in the lower part of the solum and in the underlying material. Slopes range from 0 to 5 percent.

Rutland soils are similar to Chenoa and Swygert soils and commonly are adjacent to Bryce soils on the landscape. The poorly drained Bryce soils are in the lower positions on the landscape. Chenoa and Swygert soils are in landscape positions similar to those of the Rutland soils. Chenoa soils have less clay throughout than the Rutland soils. Swygert soils formed in less than 20 inches of loess and glacial till.

Typical pedon of Rutland silty clay loam, 0 to 2 percent slopes, 200 feet east and 100 feet north of the southwest corner of sec. 6, T. 27 N., R. 3 E.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

AB—8 to 15 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—15 to 21 inches; brown (10YR 4/3) silty clay; few fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 28 inches; dark brown (10YR 4/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—28 to 37 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few very fine roots; slightly alkaline; clear smooth boundary.

2Btk—37 to 46 inches; light olive brown (2.5Y 5/4) and gray (2.5Y 6/0) silty clay; weak medium prismatic structure; firm; few prominent gray (10YR 5/1) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; few pebbles; slightly alkaline; clear smooth boundary.

2C—46 to 60 inches; light olive brown (2.5Y 5/4) and gray (2.5Y 6/0) silty clay; massive; firm; few fine dark accumulations of iron and manganese oxides; few fine light-colored concretions of calcium carbonate; few pebbles; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 3 to 6 and chroma of 1 to 4. The 2Bt and 2C horizons have value of 4 to 6 and chroma of 1 to 6.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvial sediments. Slopes range from 0 to 2 percent.

Sawmill soils are similar to Patton and Zook soils and commonly are adjacent to Barrington, Harco, and

Patton soils on the landscape. Barrington, Harco, and Patton soils have a thinner mollic epipedon than the Sawmill soils. The moderately well drained Barrington and somewhat poorly drained Harco soils formed in loess and in the underlying lacustrine sediments. They are in the higher positions on the landscape. Patton soils are in the slightly higher positions. They formed in loess and lacustrine sediments. Zook soils are in landscape positions similar to those of the Sawmill soils. They contain more clay throughout the solum than the Sawmill soils.

Typical pedon of Sawmill silty clay loam, frequently flooded, 140 feet west and 1,350 feet south of the northeast corner of sec. 31, T. 30 N., R. 3 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A1—9 to 17 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

A2—17 to 24 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate medium granular; friable; few very fine roots; few pebbles; neutral; clear smooth boundary.

A3—24 to 29 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few pebbles; neutral; clear smooth boundary.

Bg1—29 to 36 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure; friable; few very fine roots; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles; neutral; clear smooth boundary.

Bg2—36 to 41 inches; dark gray (5Y 4/1) silty clay loam; common medium prominent yellowish brown (10YR 5/4) and few fine prominent dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure; friable; few very fine roots; few prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

BCg—41 to 48 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent yellowish brown (10YR 5/4) and common fine prominent dark grayish brown (10YR 4/2) mottles; very weak medium prismatic structure; firm; few very fine roots; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; abrupt smooth boundary.

Cg—48 to 60 inches; gray (10YR 5/1) and brownish yellow (10YR 6/6) silt loam; massive; firm; few fine dark accumulations of iron and manganese oxides; slightly alkaline.

The thickness of the solum ranges from 38 to 58 inches. The depth to free carbonates ranges from 48 to more than 60 inches. The thickness of the mollic epipedon ranges from 25 to 35 inches.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. It is silt loam or silty clay loam. The Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2.

Saybrook Series

The Saybrook series consists of moderately well drained, moderately permeable soils on till plains. These soils formed in 24 to 40 inches of loess and loam or silt loam glacial till. Slopes range from 2 to 5 percent.

Saybrook soils are similar to Barrington and Varna soils and commonly are adjacent to Drummer and Lisbon soils on the landscape. Barrington soils are in positions on lake plains similar to those of the Saybrook soils. The poorly drained Drummer and somewhat poorly drained Lisbon soils are in the lower positions on the landscape. Varna soils formed in less than 20 inches of loess. They contain more clay in the subsoil and the underlying till than the Saybrook soils.

Typical pedon of Saybrook silt loam, 2 to 5 percent slopes, 69 feet west and 39 feet north of the southeast corner of sec. 4, T. 25 N., R. 6 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

AB—10 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate medium granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—13 to 17 inches; dark brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 4/3) clay films on faces of peds; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark

accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Bt2—17 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on face of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bt3—23 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine distinct gray (10YR 6/1) mottles; moderate medium prismatic structure; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2Bt4—27 to 34 inches; light olive brown (2.5Y 5/4) silt loam; common fine prominent yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; moderate medium prismatic structure; firm; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

2Bt5—34 to 38 inches; light olive brown (2.5Y 5/4) silt loam; common fine prominent yellowish brown (10YR 5/6) and common fine prominent gray (10YR 6/1) mottles; weak medium prismatic structure; firm; few very fine roots; very few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.

2C—38 to 60 inches; olive brown (2.5Y 4/4) silt loam; common medium prominent yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; massive; firm; very few distinct dark grayish brown (2.5Y 4/2) pressure faces on cleavage planes; few fine dark accumulations of iron and manganese oxides; few pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 24 to 40 inches. The depth to free carbonates ranges from 21 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 16 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The AB horizon has value of 3 or 4 and chroma of 1 to 3. It is silt loam or silty clay loam. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is clay loam, loam, or silt loam. The 2C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 or 4. It is loam or silt loam.

Selma Series

The Selma series consists of poorly drained soils on outwash plains. These soils formed in loamy sediments underlain by coarse textured sediments. Permeability is moderate in the solum and moderately rapid in the underlying material. Slopes range from 0 to 2 percent.

Selma soils are similar to Reddick and Westland soils and commonly are adjacent to Jasper and La Hogue soils on the landscape. The well drained Jasper and somewhat poorly drained La Hogue soils are in the higher positions on the landscape. The poorly drained Reddick soils have more clay in the underlying material than the Selma soils. The poorly drained Westland soils have more gravel in the underlying material than the Selma soils.

Typical pedon of Selma clay loam, 640 feet west and 2,520 feet north of the southeast corner of sec. 18, T. 27 N., R. 6 E.

Ap—0 to 11 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A—11 to 16 inches; very dark gray (10YR 3/1) clay loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg1—16 to 24 inches; dark grayish brown (2.5Y 4/2) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very friable; few fine roots; few prominent black (10YR 2/1) organic coatings on faces of peds; common faint very dark grayish brown (2.5Y 3/2) clay films on faces of peds; neutral; clear smooth boundary.

Btg2—24 to 31 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; very friable; few fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Btg3—31 to 37 inches; grayish brown (2.5Y 5/2) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; very friable; few fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

BCg—37 to 46 inches; grayish brown (2.5Y 5/2) sandy

loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; very friable; few fine roots; very dark grayish brown (10YR 3/2) krotovina 1 inch thick; few fine dark accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Cg—46 to 60 inches; gray (10YR 5/1) loamy sand; many medium prominent yellowish brown (10YR 5/6) mottles; single grain; loose; many pebbles; neutral.

The thickness of the solum ranges from 35 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has chroma of 1 or 2. The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is loam, clay loam, or silty clay loam. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 6. It is stratified sand, loamy sand, sandy loam, or loam.

Starks Series

The Starks series consists of somewhat poorly drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in 24 to 40 inches of loess and loamy outwash. Slopes range from 0 to 2 percent.

Starks soils are similar to Brenton and Whitaker soils and commonly are adjacent to Brenton and Camden soils on the landscape. Brenton soils have a mollic epipedon. They are in landscape positions similar to those of the Starks soils. The moderately well drained Camden soils are in the higher positions on the landscape. Whitaker soils contain more sand in the solum than the Starks soils.

Typical pedon of Starks silt loam, 0 to 2 percent slopes, 600 feet east and 30 feet south of the northwest corner of sec. 33, T. 30 N., R. 4 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E—10 to 14 inches; grayish brown (10YR 5/2) silt loam; common fine faint brown (10YR 5/3) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct white (10YR 8/1 dry) silt coatings on faces of peds; neutral; abrupt smooth boundary.

BE—14 to 17 inches; dark brown (10YR 4/3) and grayish brown (10YR 5/2) silty clay loam; common fine faint yellowish brown (10YR 5/4) and few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct white (10YR 8/1 dry) silt coatings on faces of peds; neutral; abrupt smooth boundary.

Bt—17 to 21 inches; dark brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg1—21 to 25 inches; gray (10YR 5/1) silty clay loam; common fine prominent dark brown (7.5YR 4/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg2—25 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

2Btg3—31 to 43 inches; grayish brown (2.5Y 5/2), stratified silt loam and sandy loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine angular blocky; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Cg—43 to 60 inches; grayish brown (2.5Y 5/2) sandy loam; thin strata of loamy sand; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; very friable; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to free carbonates ranges from 40 to more than 60 inches.

The Ap horizon has value of 4 or 5 and chroma of 1 to 3. The E and BE horizons have value of 5 or 6 and chroma of 2 or 3. The BE horizon is silt loam or silty clay loam. The Bt horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 4. The 2Bt and 2BC horizons have hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 6. They are sandy loam, silt loam, silty clay loam, or clay loam. The 2C horizon has hue of

2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 6. It is stratified sandy loam, loam, silt loam, or clay loam.

St. Clair Series

The St. Clair series consists of moderately well drained, very slowly permeable soils on till plains. These soils formed in silty clay or clay till. Slopes range from 12 to 35 percent.

St. Clair soils are similar to Hennepin soils and commonly are adjacent to Nappanee soils on the landscape. Hennepin soils are in landscape positions similar to those of the St. Clair soils. They have less clay throughout than the St. Clair soils. The somewhat poorly drained Nappanee soils are in the less sloping positions on the landscape.

Typical pedon of St. Clair silty clay loam, 20 to 35 percent slopes, 1,400 feet east and 900 feet north of the southwest corner of sec. 6, T. 29 N., R. 5 E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Bt1—5 to 12 inches; dark brown (10YR 4/3) silty clay; moderate fine subangular blocky structure; very firm; few very fine roots; few faint very dark grayish brown (10YR 5/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 18 inches; dark brown (10YR 4/3) silty clay; common medium faint yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; very firm; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

BC—18 to 26 inches; brown (10YR 5/3) silty clay; common fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; very firm; few very fine roots; few pebbles; violent effervescence; moderately alkaline; clear smooth boundary.

2C—26 to 60 inches; brown (10YR 5/3) silty clay: common medium distinct yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) mottles; massive; very firm; few very fine roots; violent effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 0 to 20 inches. The thickness of the mollic epipedon is less than 6 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is silty clay or clay. The C horizon has value of 4 or 5 and chroma of 1 to 4. It is silty clay loam, silty clay, or clay.

The St. Clair soils in this survey area have free carbonates closer to the surface than is defined as the range for the series.

Streator Series

The Streator series consists of poorly drained soils on till plains. These soils formed in loess and clayey, calcareous glacial till. Permeability is moderately slow in the upper part of the subsoil and slow in the lower part of the subsoil and in the underlying material. Slopes range from 0 to 2 percent.

Streator soils are similar to Bryce and Milford soils and commonly are adjacent to Rutland soils on the landscape. Bryce and Milford soils are in landscape positions similar to those of the Streator soils. They have mixed clay mineralogy in the control section. Also, Milford soils have less clay in the underlying material than the Streator soils. The somewhat poorly drained Rutland soils are higher on the landscape than the Streator soils.

Typical pedon of Streator silty clay loam, 415 feet south and 50 feet west of the northeast corner of sec. 19, T. 30 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; strong medium and coarse granular structure; friable; many roots; neutral; clear smooth boundary.

A—8 to 12 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; strong medium and coarse granular structure; firm; many roots; neutral; clear smooth boundary.

AB—12 to 16 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium prismatic structure parting to moderate fine and medium angular blocky; firm; many roots; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Btg1—16 to 20 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate fine and medium angular blocky; firm; many roots; many prominent very dark gray (10YR 3/1) clay films on faces of peds; few dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Btg2—20 to 30 inches; olive gray (5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure parting to strong medium and coarse angular blocky; very firm; many roots; many faint dark gray (5Y 4/1) clay films on faces of peds;

many dark concretions of iron and manganese oxides; neutral; gradual smooth boundary.

Btg3—30 to 38 inches; dark gray (5Y 4/1) silty clay loam; many fine prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure parting to moderate medium and coarse angular blocky; very firm; many roots; many prominent grayish brown (10YR 5/2) and faint gray (5Y 5/1) clay films on faces of peds; many dark concretions of iron and manganese oxides; slightly alkaline; gradual smooth boundary.

Btg4—38 to 43 inches; olive gray (5Y 5/2) silty clay loam; many fine and medium prominent yellowish brown (10YR 5/4 and 5/6) mottles; moderate coarse prismatic structure parting to weak medium and coarse angular blocky; very firm; few roots; common faint gray (5Y 5/1) clay films on faces of peds; slightly alkaline; gradual smooth boundary.

2Btg5—43 to 51 inches; olive gray (5Y 5/2) silty clay; many fine and medium prominent yellowish brown (10YR 5/4 and 5/6) mottles; weak medium and coarse prismatic structure; very firm; common faint gray (5Y 5/1) clay films on faces of peds; many pebbles; strong effervescence; slightly alkaline; gradual smooth boundary.

2C—51 to 60 inches; gray (5Y 5/1) silty clay; many fine and medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive; very firm; slight effervescence; slightly alkaline.

The thickness of the solum ranges from 45 to 55 inches. The depth to free carbonates commonly is less than the thickness of the solum. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 1 or 2 and chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. It is silty clay or silty clay loam. The 2C horizon has hue of 2.5Y or 5Y. It is silty clay or clay.

Swygert Series

The Swygert series consists of somewhat poorly drained soils on till plains. These soils formed in lacustrine sediments and glacial till. Some pedons have a mantle of loess as much as 20 inches thick. Permeability is slow in the solum and very slow in the underlying glacial till. Slopes range from 0 to 4 percent.

Swygert soils are similar to Clarence and Elliott soils and commonly are adjacent to Bryce and Rutland soils on the landscape. The poorly drained Bryce soils are in the lower positions on the landscape. Clarence and Rutland soils are in landscape positions similar to those of the Swygert soils. Clarence soils have a B horizon that formed entirely in clayey glacial till. Rutland soils have a B horizon that formed in loess as much as 55 inches thick. Elliott soils have less clay throughout than the Swygert soils.

Typical pedon of Swygert silty clay loam, 0 to 2 percent slopes, 28 feet east and 960 feet south of the northwest corner of sec. 8, T. 30 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

AB—9 to 14 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few very fine roots; slightly acid; clear smooth boundary.

Bt1—14 to 21 inches; light olive brown (2.5Y 5/4) silty clay; common fine distinct grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—21 to 28 inches; light olive brown (2.5Y 5/4) silty clay; many fine distinct grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; common prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few prominent very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt3—28 to 31 inches; light olive brown (2.5Y 5/6) silty clay; many medium distinct grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; slight effervescence; slightly alkaline; clear smooth boundary.

2Bt4—31 to 37 inches; light olive brown (2.5Y 5/6) silty clay; many medium prominent gray (5Y 6/1) mottles; weak fine prismatic structure parting to weak medium angular blocky; firm; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2Bt5—37 to 41 inches; light olive brown (2.5Y 5/6) silty clay; many medium prominent gray (5Y 6/1) mottles; weak fine prismatic structure; firm; few prominent gray (5Y 5/1) clay films on faces of peds;

few pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2C—41 to 60 inches; light olive brown (2.5Y 5/4) silty clay; many medium prominent gray (5Y 6/1) mottles; massive; very firm; few pebbles; violent effervescence; slightly alkaline.

The thickness of the solum ranges from 35 to 55 inches. The depth to free carbonates ranges from 20 to 50 inches. The thickness of the mollic epipedon ranges from 6 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt and 2Bt horizons have hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 6. The 2C horizon has value of 4 to 6 and chroma of 1 to 4.

Swygert silty clay loam, 2 to 4 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series.

Symerton Series

The Symerton series consists of moderately well drained soils on till plains. These soils formed in loamy glacial outwash and in the underlying silty clay loam glacial till or lakebed sediments. Permeability is moderate in the subsoil and slow in the underlying material. Slopes range from 2 to 9 percent.

Symerton soils are similar to Jasper and Varna soils and commonly are adjacent to Andres and Reddick soils on the landscape. The somewhat poorly drained Andres soils are in the nearly level, slightly lower positions on the landscape. The well drained Jasper soils formed entirely in loamy outwash. The poorly drained Reddick soils are in low positions and in drainageways. Varna soils contain more clay and less sand in the subsoil than the Symerton soils.

Typical pedon of Symerton loam, 2 to 4 percent slopes, eroded, 60 feet west and 1,410 feet north of the southeast corner of sec. 14, T. 29 N., R. 8 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; mixed with some pockets of dark yellowish brown (10YR 4/4) clay loam subsoil material; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Bw—9 to 13 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few pebbles; neutral; clear smooth boundary.

Bt1—13 to 18 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct brown (7.5YR 4/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.

Bt2—18 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.

Bt3—25 to 31 inches; dark yellowish brown (10YR 4/4) clay loam; common fine distinct brown (7.5YR 4/4) and few fine distinct grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few pebbles; slightly alkaline; clear smooth boundary.

Bt4—31 to 35 inches; brown (10YR 5/3) clay loam; common fine distinct brown (7.5YR 4/4) and common fine faint grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few pebbles; slightly alkaline; clear smooth boundary.

2BC—35 to 43 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium distinct grayish brown (2.5Y 5/2) and common fine prominent brown (7.5YR 4/4) mottles; weak fine prismatic structure; firm; few very fine roots; common pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2C—43 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate medium distinct grayish brown (2.5Y 5/2) mottles; massive; firm; common pebbles; violent effervescence; slightly alkaline.

The thickness of the solum ranges from 32 to 50 inches. The depth to free carbonates ranges from 25 to 55 inches and commonly is less than the thickness of the solum. The thickness of the mollic epipedon ranges from 8 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5Y, value of 4 or 5, and chroma of 3 to 6. It is clay loam, silty clay loam, or sandy clay loam. The 2Bt or 2BC horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is silty clay loam, clay loam, or silt loam that has a high content of clay. The 2C horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 3 or 4.

Symerton loam, 2 to 4 percent slopes, eroded, and Symerton silt loam, 4 to 9 percent slopes, eroded, have

a thinner dark surface layer than is defined as the range for the series.

Thorp Series

The Thorp series consists of poorly drained soils on stream terraces, outwash plains, and till plains. These soils formed in loess and loamy outwash on outwash plains. Permeability is slow in the solum and moderately rapid in the underlying material. Slopes range from 0 to 2 percent.

Thorp soils are similar to Monee soils and commonly are adjacent to Ashkum and Drummer soils on the landscape. Ashkum and Drummer soils are higher on the landscape than the Thorp soils. Ashkum soils formed in silty sediments and silty clay loam glacial till. Drummer soils do not have an E horizon. Monee soils are fine textured.

Typical pedon of Thorp silt loam, 1,935 feet east and 750 feet south of the northwest corner of sec. 30, T. 30 N., R. 4 E.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few very fine roots; moderately acid; abrupt smooth boundary.

Eg—11 to 15 inches; light gray (10YR 6/1) silt loam, light brownish gray (10YR 6/2) dry; few fine prominent yellowish brown (10YR 5/6) mottles; weak thin platy structure; friable; few very fine roots; few fine dark concretions of iron and manganese oxides; moderately acid; clear smooth boundary.

Btg1—15 to 22 inches; gray (10YR 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.

Btg2—22 to 30 inches; gray (10YR 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.

2Btg3—30 to 36 inches; light gray (10YR 6/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; moderately acid; clear smooth boundary.

2Btg4—36 to 41 inches; light gray (10YR 6/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; friable; few very fine roots; few faint light brownish gray (10YR 6/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; moderately acid; clear smooth boundary.

2Btg5—41 to 49 inches; light gray (10YR 6/1) sandy clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; friable; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few pebbles; moderately acid; clear smooth boundary.

2Cg—49 to 60 inches; light gray (10YR 6/1), stratified sandy loam and silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few pebbles; neutral.

The thickness of the solum ranges from 40 to 60 inches. The depth to free carbonates is more than 40 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. The 2BC and 2C horizons have hue of 10YR, 2.5Y, or 5Y. They are sandy loam, silty clay loam, clay loam, loam, or sandy clay loam.

Tuscola Series

The Tuscola series consists of moderately well drained, moderately permeable soils on outwash plains. These soils formed in loamy outwash. Slopes range from 2 to 10 percent.

Tuscola soils are similar to Camden soils and commonly are adjacent to Hennepin and Whitaker soils on the landscape. Camden soils are in landscape positions similar to those of the Tuscola soils. They are fine-silty. The well drained Hennepin soils are on the steeper side slopes. The somewhat poorly drained Whitaker soils are on the more nearly level parts of the landscape.

Typical pedon of Tuscola loam, 2 to 5 percent slopes, 483 feet south and 213 feet west of the northeast corner of sec. 8, T. 29 N., R. 4 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

BE—6 to 11 inches; brown (10YR 5/3) loam; weak fine

subangular blocky structure; friable; few very fine roots; slightly acid; clear smooth boundary.

Bt1—11 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 20 inches; dark brown (7.5YR 4/4) clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—20 to 30 inches; strong brown (7.5YR 4/6) sandy clay loam; few fine prominent dark grayish brown (10YR 4/2) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt4—30 to 37 inches; dark brown (7.5YR 4/4) sandy clay loam; common medium prominent grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

BC—37 to 50 inches; grayish brown (10YR 5/2) sandy loam; many medium prominent strong brown (7.5YR 5/6 and 4/6) mottles; weak fine prismatic structure; friable; common fine dark concretions of iron and manganese oxides; few pebbles; slightly acid; clear smooth boundary.

C—50 to 60 inches; brown (7.5YR 5/4) sandy loam; common medium prominent gray (10YR 5/1) mottles; massive; friable; few fine dark concretions of iron and manganese oxides; few pebbles; neutral.

The thickness of the solum ranges from 40 to 50 inches. The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is silty clay loam, clay loam, sandy clay loam, or sandy loam. The C horizon has value of 5 or 6 and chroma of 2 to 4. It is stratified loamy sand, sandy loam, loam, or silt loam.

The Tuscola soils in this survey area have lower chroma and higher value than are defined as the range for the series and are lower in reaction. They also have more sand in the C horizon than is definitive for the series, and they do not have free carbonates in the C horizon.

Varna Series

The Varna series consists of moderately well drained soils on till plains. These soils formed in less than 20 inches of loess and silty clay loam glacial till. Permeability is moderately slow in the subsoil and slow in the underlying material. Slopes range from 2 to 9 percent.

Varna soils are similar to Saybrook and Symerton soils and commonly are adjacent to Ashkum and Elliott soils on the landscape. The poorly drained Ashkum and somewhat poorly drained Elliott soils are in the lower positions on the landscape. Saybrook and Symerton soils are in landscape positions similar to those of the Varna soils. Saybrook soils are fine-silty, and Symerton soils are fine-loamy.

The Varna soils in this survey area have a thinner dark surface layer than is defined as the range for the series.

Typical pedon of Varna silty clay loam, 4 to 9 percent slopes, eroded, 180 feet east and 1,575 feet north of the center of sec. 35, T. 29 N., R. 8 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; mixed with some pockets of dark yellowish brown (10YR 4/4) silty clay loam subsoil material; moderate fine granular structure; friable; few fine roots; moderately acid; abrupt smooth boundary.

BA—8 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few very fine roots; moderately acid; clear smooth boundary.

Bt1—13 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

2Bt2—17 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few pebbles; slightly acid; clear smooth boundary.

2Bt3—22 to 27 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine distinct light olive brown (2.5Y 5/4) and few fine distinct gray (2.5Y 6/0) mottles;

weak fine prismatic structure parting to weak fine angular blocky; firm; common faint very dark grayish brown (2.5Y 3/2) organic coatings on vertical faces of peds; few pebbles; neutral; clear smooth boundary.

2BCk—27 to 34 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/4) and few fine distinct gray (2.5Y 6/0) mottles; weak medium prismatic structure; very firm; few fine light-colored concretions of calcium carbonate; common pebbles; strong effervescence; slightly alkaline; clear smooth boundary.

2C—34 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/4) mottles; massive; very firm; few fine light-colored concretions of calcium carbonate; common pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 26 to 55 inches. The depth to free carbonates is commonly less than 42 inches. The thickness of the mollic epipedon ranges from 6 to 9 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y and value of 4 to 6. It has chroma of 3 or 4 in the upper part and 2 to 4 in the lower part. It is silty clay loam or silty clay. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6.

Wallkill Series

The Wallkill series consists of very poorly drained soils on outwash plains and till plains. These soils formed in silty sediments and herbaceous organic deposits. Permeability is moderate in the silty sediments and moderately rapid in the organic deposits. Slopes range from 0 to 2 percent.

Wallkill soils are similar to Houghton soils and commonly are adjacent to Houghton and Sawmill soils on the landscape. Houghton soils are in the lower positions on the landscape. They formed entirely in herbaceous organic deposits. Sawmill soils formed entirely in silty sediments. They are higher on the landscape than the Wallkill soils.

The Wallkill soils in this survey area have less sand and more silt and clay in the control section than are defined as the range for the series.

Typical pedon of Wallkill silt loam, frequently flooded, 480 feet west and 3,875 feet south of the northeast corner of sec. 6, T. 25 N., R. 8 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A1—9 to 16 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

A2—16 to 24 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine prismatic structure parting to moderate medium angular blocky; friable; few fine roots; common snail shells; strong effervescence; mildly alkaline; clear smooth boundary.

A3—24 to 34 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; few fine prominent dark brown (7.5YR 4/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few snail shells; mildly alkaline; clear smooth boundary.

2Oa1—34 to 43 inches; sapric material, black (2.5Y 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; common fine prominent strong brown (7.5YR 4/6) mottles; massive; very friable; few fine roots; neutral; clear smooth boundary.

2Oa2—43 to 60 inches; sapric material, black (2.5Y 2/0) rubbed; about 15 percent fiber, 5 percent rubbed; few fine prominent strong brown (7.5YR 4/6) mottles; massive; very friable; few fine roots; neutral.

The mineral soil ranges from 16 to 40 inches thick. The Ap horizon has value of 2 to 4 and chroma of 1 or 2. The 2Oa horizon has hue of 5YR to 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. Some pedons have woody fragments, which cannot be crushed between the fingers. The subsurface tiers are dominantly sapric material, but some pedons have thin strata of hemic and fibric material.

Wea Series

The Wea series consists of well drained soils on terraces. These soils formed in loamy outwash over gravelly outwash. Permeability is moderate in the upper part and very rapid in the lower part. Slopes range from 0 to 5 percent.

Wea soils are similar to Jasper and Symerton soils and commonly are adjacent to Crane and Westland soils on the landscape. The poorly drained Westland and somewhat poorly drained Crane soils are in the lower positions on the landscape. Jasper soils contain less gravel in the underlying material than the Wea soils. Symerton soils are underlain by silty clay loam glacial till.

Typical pedon of Wea loam, 0 to 2 percent slopes, 2,550 feet east and 1,500 feet south of the northwest corner of sec. 5, T. 27 N., R. 6 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; moderately acid; abrupt smooth boundary.

A—8 to 12 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine roots; moderately acid; clear smooth boundary.

Bt1—12 to 17 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—17 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt3—23 to 29 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt4—29 to 40 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium prismatic structure parting to weak medium angular blocky; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; few very fine roots; moderately acid; clear smooth boundary.

3Bt5—40 to 46 inches; dark yellowish brown (10YR 4/4) gravelly sandy clay loam; weak medium prismatic structure parting to weak fine angular blocky; friable; few faint dark brown (10YR 4/3) clay bridges; few very fine roots; slightly acid; clear smooth boundary.

3Bt6—46 to 54 inches; dark brown (10YR 4/3) gravelly sandy clay loam; weak medium prismatic structure parting to weak medium angular blocky; friable; few faint dark brown (10YR 3/3) clay bridges; few very fine roots; slightly acid; clear smooth boundary.

3C—54 to 60 inches; dark yellowish brown (10YR 4/4) gravelly sand; single grain; loose; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches and typically is the same as the depth to calcareous sand and gravel. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value and chroma of 2 or 3. The Bt horizon has hue of 7.5YR or 10YR and value of 4 or 5. It is silty clay loam or clay loam. The 2Bt and 3Bt horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. The content of gravel in the Bt horizons ranges from 0 to 10 percent in the upper part and from 15 to 30 percent in the lower part. The 3Bt horizon is gravelly sandy clay loam or gravelly clay loam. The C horizon has value of 4 or 5 and chroma of 3 or 4. It ranges from 20 to 55 percent gravel.

Wenona Series

The Wenona series consists of moderately well drained, moderately slowly permeable soils on glacial lake plains or till plains. These soils formed in 30 to 40 inches of loess and in the underlying silty clay loam or silt loam lacustrine sediments. Slopes range from 2 to 10 percent.

Wenona soils are similar to Barrington and Mona soils and commonly are adjacent to Bryce and Swygert soils on the landscape. Barrington soils contain less clay in the control section than the Wenona soils. The poorly drained Bryce and somewhat poorly drained Swygert soils are in the lower positions on the landscape. They are underlain by silty clay till. Mona soils contain more sand in the solum than the Wenona soils and are underlain by silty clay till.

Typical pedon of Wenona silt loam, loamy substratum, 2 to 5 percent slopes, 330 feet east and 993 feet south of the northwest corner of sec. 19, T. 29 N., R. 7 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 5/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—7 to 13 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; clear smooth boundary.

BA—13 to 17 inches; dark brown (10YR 4/3) silt loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—17 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few very dark gray (10YR 3/1) organic coatings on faces of peds; few faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint dark brown (10YR

4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—29 to 38 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt4—38 to 50 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2C—50 to 60 inches; brown (10YR 5/3), stratified silt loam; many fine faint grayish brown (10YR 5/2) and few medium distinct dark brown (7.5YR 4/4) mottles; massive; friable; few fine dark concretions of iron and manganese oxides; violent effervescence; slightly alkaline.

The thickness of the solum ranges from 40 to 55 inches. The depth to free carbonates ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 8 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The 2Bt horizon has value of 4 to 6 and chroma of 2 to 6. The 2BC and 2C horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 2 to 6. They are stratified silt loam, silty clay loam, or loam.

Wesley Series

The Wesley series consists of somewhat poorly drained soils on till plains. These soils formed in coarse textured outwash and silty clay loam glacial till. Permeability is moderately rapid in the upper part of the subsoil and slow in the lower part of the subsoil and in the underlying material. Slopes range from 0 to 2 percent.

Wesley soils are similar to Andres and Ridgeville soils and commonly are adjacent to Reddick and Symerton soils on the landscape. Andres soils are in landscape positions similar to those of the Wesley soils. They contain more clay throughout the control section than the Wesley soils. The poorly drained Reddick soils are in low positions and in drainageways. They contain more clay in the control section than the Wesley soils. Ridgeville soils formed entirely in outwash. They contain less clay in the lower part of the subsoil and in the underlying material than the Wesley soils. The moderately well drained Symerton soils are in the more sloping, higher positions. They contain more clay in the solum than the Wesley soils.

Typical pedon of Wesley fine sandy loam, 0 to 2 percent slopes, 1,000 feet west and 270 feet north of the southeast corner of sec. 14, T. 30 N., R. 8 E.

Ap—0 to 10 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

AB—10 to 13 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—13 to 18 inches; dark brown (10YR 4/3) fine sandy loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few very fine roots; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—18 to 27 inches; yellowish brown (10YR 5/4) fine sandy loam; common fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt3—27 to 30 inches; yellowish brown (10YR 5/6) loamy fine sand; common fine distinct grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to weak fine angular blocky; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bw—30 to 38 inches; brown (10YR 5/3) loamy fine sand; common fine faint grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; friable; few fine dark concretions of iron and manganese oxides; common pebbles; very slight effervescence; neutral; clear smooth boundary.

2BCg—38 to 43 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and many medium distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure; firm; few fine dark concretions of iron and manganese oxides; common pebbles; slight

effervescence; slightly alkaline; clear smooth boundary.

2Cg—43 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and many medium distinct light olive brown (2.5Y 5/4) mottles; massive; firm; few fine dark concretions of iron and manganese oxides; common pebbles; strong effervescence; slightly alkaline.

The thickness of the solum ranges from 24 to 53 inches. The depth to free carbonates ranges from 20 to 50 inches. The thickness of the mollic epipedon ranges from 12 to 21 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 6. It is loamy fine sand or fine sandy loam. The 2BC and 2C horizons have hue of 5Y or 2.5Y or are neutral in hue. They have value of 4 to 6 and chroma of 0 to 4. They are silty clay loam, clay loam, or loam and contain free carbonates.

Westland Series

The Westland series consists of poorly drained soils on gravel terraces. These soils formed in loamy outwash over gravelly outwash. Permeability is moderate in the solum and very rapid in the underlying material. Slopes range from 0 to 2 percent.

Westland soils are similar to Reddick and Selma soils and commonly are adjacent to Crane and Wea soils on the landscape. The somewhat poorly drained Crane and well drained Wea soils are in the higher positions on the landscape. The poorly drained Reddick soils are underlain by glacial till. The poorly drained Selma soils contain less gravel than the Westland soils.

Typical pedon of Westland clay loam, 1,000 feet south and 1,345 feet west of the center of sec. 26, T. 28 N., R. 5 E.

Ap—0 to 7 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

A—7 to 13 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

AB—13 to 17 inches; very dark gray (10YR 3/1) clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; common very fine roots; neutral; clear smooth boundary.

Btg1—17 to 23 inches; dark grayish brown (2.5Y 5/2) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; friable; common very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; common pebbles less than 5 millimeters in diameter; neutral; clear smooth boundary.

Btg2—23 to 29 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; friable; common very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; common pebbles less than 5 millimeters in diameter; neutral; clear smooth boundary.

Btg3—29 to 37 inches; grayish brown (2.5Y 5/2) clay loam; common medium prominent dark brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine dark accumulations of iron and manganese oxides; common pebbles less than 5 millimeters in diameter; neutral; clear smooth boundary.

2BCg—37 to 49 inches; grayish brown (2.5Y 5/2) gravelly clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; very few faint gray (2.5Y 5/1) clay films on faces of peds; strong effervescence; slightly alkaline; clear smooth boundary.

2C—49 to 60 inches; light olive brown (2.5Y 5/4) gravelly sand; common fine distinct brownish yellow (10YR 6/6) mottles; single grain; loose; violent effervescence; slightly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Btg horizon has hue of 10YR, 5Y, or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is clay loam, gravelly clay loam, or gravelly loam. The 2BCg horizon has hue of 10YR, 5Y, or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is calcareous gravelly clay loam or gravelly sandy clay loam.

Whitaker Series

The Whitaker series consists of somewhat poorly drained, moderately permeable soils on outwash plains

and stream terraces. These soils formed in loamy outwash. Slopes range from 0 to 2 percent.

Whitaker soils are similar to La Hogue and Starks soils and commonly are adjacent to Selma and Tuscola soils on the landscape. La Hogue soils have a mollic epipedon and do not have an E horizon. The poorly drained Selma soils have a mollic epipedon. They are in the lower positions on the landscape. Starks soils contain less sand throughout the solum than the Whitaker soils. The moderately well drained Tuscola soils are in the higher positions on the landscape.

Typical pedon of Whitaker loam, 0 to 2 percent slopes, 200 feet south and 1,190 feet east of the northwest corner of sec. 9, T. 29 N., R. 4 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loam, light gray (10YR 7/1) dry; moderate medium granular structure; friable; few very fine roots; few fine dark accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

E—9 to 15 inches; brown (10YR 5/3) loam; common fine faint yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; moderately acid; abrupt smooth boundary.

Bt1—15 to 20 inches; dark brown (10YR 4/3) clay loam; common fine distinct gray (10YR 5/1) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; common faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few pebbles; moderately acid; clear smooth boundary.

Bt2—20 to 28 inches; dark brown (10YR 4/3) clay loam; many medium distinct gray (10YR 5/1) mottles; weak fine prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few pebbles; moderately acid; clear smooth boundary.

Bt3—28 to 35 inches; grayish brown (10YR 5/2) sandy loam; common fine faint gray (10YR 5/1) mottles; moderate medium subangular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common medium dark accumulations of iron and manganese oxides; few pebbles; moderately acid; clear smooth boundary.

BC—35 to 46 inches; grayish brown (10YR 5/2) sandy loam; common fine faint gray (10YR 5/1) and common medium prominent brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few medium dark accumulations of iron and manganese oxides; few pebbles; slightly acid; clear smooth boundary.

C—46 to 60 inches; brown (10YR 5/3) loamy sand; common medium distinct yellowish brown (10YR 5/6) and common medium distinct gray (10YR 5/1) mottles; single grain; loose; few pebbles; neutral.

The thickness of the solum and the depth to free carbonates range from 40 to 60 inches. The Ap and E horizons have value of 4 or 5 and chroma of 2 or 3. The E horizon is silt loam or loam. The Bt, BC, and C horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. The Bt horizon is loam, sandy loam, clay loam, or sandy clay loam. The BC horizon is sandy loam or loam. The C horizon is loam, sandy loam, or loamy sand.

Zook Series

The Zook series consists of poorly drained, slowly permeable soils on flood plains. These soils formed in clayey alluvial sediments. Slopes range from 0 to 2 percent.

Zook soils are similar to Rantoul and Sawmill soils and commonly are adjacent to Bryce and Swygert soils on the landscape. Bryce soils have a thinner mollic epipedon than the Zook soils. They are in the slightly higher positions on the landscape. Rantoul soils are in upland depressions and are subject to ponding. Sawmill soil are in landscape positions similar to those of the Zook soils. They contain less clay throughout than the Zook soils. The somewhat poorly drained Swygert soils are in the higher positions on the landscape. They have a thinner mollic epipedon than the Zook soils.

Typical pedon of Zook silty clay loam, frequently flooded, 33 feet west and 1,020 feet south of the northeast corner of sec. 8, T. 27 N., R. 7 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few fine roots; few pebbles; slightly acid; abrupt smooth boundary.

A1—9 to 16 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few fine roots; few pebbles; neutral; clear smooth boundary.

A2—16 to 27 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few fine roots; few pebbles; neutral; clear smooth boundary.

A3—27 to 37 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; few fine roots; few fine dark accumulations of iron and manganese

oxides; few pebbles; neutral; clear smooth boundary.

Bg1—37 to 42 inches; dark gray (10YR 4/1) silty clay; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

Bg2—42 to 53 inches; dark gray (10YR 4/1) silty clay; common fine prominent yellowish brown (10YR 5/6) and common fine distinct grayish brown (2.5Y 5/2) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; common faint gray (10YR 5/1) pressure faces on faces of peds; few fine dark accumulations of iron and manganese oxides; few pebbles; neutral; clear smooth boundary.

BCg—53 to 60 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure; firm; few pebbles; neutral.

The thickness of the solum ranges from 36 to 60 inches. The depth to free carbonates is 50 to more than 60 inches. The thickness of the mollic epipedon ranges from 36 to 50 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. The B and C horizons have hue of 10YR to 5Y and value of 2 to 5.

Formation of the Soils

Soil-forming processes act on materials deposited or accumulated by geologic forces, such as wind, water, or glacial ice. The characteristics of the soil are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and has existed since accumulation; the plant and animal life on and in the soil; relief, or lay of the land; and the length of time the processes of soil formation have acted on the soil material *(5)*.

Climate and plant and animal life, chiefly plants, are active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks or that may have been relocated by water, glaciers, or wind and slowly change it into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil profile. Some time is always required for the differentiation of soil horizons. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four. Many of the processes of soil formation are unknown.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. The dominant parent materials of the soils in Livingston County are glacial till, glacial outwash, loess, lacustrine deposits, and alluvium. Some of these materials have been reworked and redeposited by subsequent actions of water and wind. Parent material determines the limits of the chemical and mineralogical composition of the soil. Although the parent materials in the county are of common glacial origin, their properties vary greatly, sometimes within small areas, depending on how the materials were deposited. The soils in Livingston County formed in a wide variety of combinations and thicknesses of these glacial materials, depending on the location in the county and the position on the landscape. These deposits occur in a complex pattern of intertwining till plains and moraines, outwash plains, and lake plains. Varying amounts of loess overlie the other deposits. Soil properties vary somewhat within the types of deposits. In a few areas the soils formed in material that was deposited in more recent times, such as alluvium and organic material.

Glacial till is material laid down directly by glaciers with a minimum of water action. It is a mixture of particles of various sizes. The small pebbles in glacial till have sharp corners, a characteristic indicating that they have not been worn by water. The glacial till in Livingston County varies greatly in texture. Elliott and Varna soils formed in a thin layer of loess and in the underlying silty clay loam glacial till. Swygert soils formed in a thin layer of loess or lacustrine sediments and in the underlying silty clay or clay glacial till.

Glacial outwash was deposited by moving water in front of the melting ice sheets. The size of the particles varies, depending on the speed of the stream that carried the material. Individual layers generally are made up of particles of similar size, such as loam, sandy loam, sand, and other coarse particles, such as gravel. When the water slowed down, the coarser particles were deposited. The finer particles, such as very fine sand, silt, and clay, were carried by the more slowly moving water. Jasper and La Hogue soils formed in loamy sediments and in stratified loamy and sandy sediments. Andres and Reddick soils formed in a layer of loamy sediments and in the underlying glacial till.

Lacustrine material was deposited in the relatively still water of glacial lakes, such as glacial Lake Pontiac and Lake Watseka. The coarser fragments drop out of moving water as outwash; consequently, only the finer particles, such as very fine sand, silt, and clay, remain to settle out in still water. The lacustrine material in Livingston County is generally silty. There are also loamy remnants of beach deposits of past shorelines of the glacial lakes in a few areas in the county.

Barrington soils formed in a layer of loess and in the underlying silty lacustrine material. Martinton and Milford soils formed entirely in silty and clayey lacustrine materials.

Loess is wind-deposited, silty material that covers the till, outwash, and lacustrine material throughout most of the county. It ranges from about 35 inches thick in the northwestern part of the county to less than 10 inches thick on the eastern side. Lisbon and Saybrook soils formed in a layer of loess and in the underlying loamy glacial till. Harco and Patton soils formed in a layer of loess and in the underlying silty lacustrine material.

Alluvium is material recently deposited by floodwater. It is silty or clayey, depending on the velocity of the floodwater and the texture of the sediment in the water. The frequently flooded Sawmill soils formed in silty alluvium, and the frequently flooded Comfrey soils formed in loamy alluvium.

Organic material consists of decomposed plant and animal remains. Soils that formed in this material are naturally wet during most of the year and are in depressions that are heavily vegetated with grasses and wetland plants. Houghton soils formed in organic material. The frequently flooded Wallkill soils formed in a layer of alluvium over the organic material.

Plant and Animal Life

Plants have had a major influence on the soils in Livingston County. Bacteria, fungi, and earthworms and the activities of humans have also been important. The chief contribution of plants and animals to soil formation is the addition of organic matter to the soil. The kind of organic material on and in the soil depends on the kind of plants that grew on the soil. The remains of the plants accumulate in the surface layer, where they decay and eventually become organic matter or humus. Plant roots provide channels for the downward movement of water through the soil and also add organic matter as they decay. Earthworms, insects, and burrowing animals help to keep the soil open and porous. They incorporate organic matter into the soil and allow the release of nutrients that can be used by growing plants.

The soils that formed under grasses have a thick, black or dark brown surface layer. Chenoa and Harco soils formed on broad prairies under wildflowers and grasses, such as big bluestem, indiangrass, and prairie dropseed. In the drier areas, little bluestem and porcupinegrass were dominant. Onarga soils formed under this type of vegetation. In the wetter areas, switchgrass and prairie cordgrass were common. Ashkum and Patton soils formed in these areas.

Various species of oak, hickory, maple, elm, and ash were dominant in wooded areas. Hackberry and walnut trees also grew in these areas. The surface layer of the soils that formed under trees is lighter in color than that of the soils that formed under grasses. Organic matter in the surface layer of these soils consists mainly of decomposed leaves. Starks, Tuscola, and Whitaker soils formed under forest vegetation.

Bluejoint reedgrass and various reeds and sedges grew in the marshes. Peotone, Rantoul, and Wallkill soils formed in these areas. These depressional and bottom-land soils have dark colors primarily as a result of plant and animal influences.

Climate

Livingston County has a temperate, humid, continental climate that has been mostly uniform during the formation of the soils. Because of this uniformity, the characteristics of the soils were not caused solely by climatic differences.

Climate influences soil formation through its effects on weathering, plant and animal life, and erosion. The rate of weathering increases as temperature and precipitation increase. Water from rain and melting snow seeps slowly downward through the soil and causes physical and chemical changes. In many of the soils, the percolating water has moved clay from the surface layer into the subsoil. It has also dissolved minerals and moved them downward through the profile. As a result, most of the upland soils in the county have considerably more clay in the subsoil than in the surface layer. In addition, free calcium carbonates have been removed from the upper layers of many of the soils, leaving these layers slightly acid.

Climate also influences soil formation by stimulating the growth of living organisms, particularly plants. Well distributed rainfall and seasonal freezing temperatures promote the accumulation of organic matter in most of the soils that support grasses. Soils that formed under forest vegetation were influenced more by the vegetation and by relief than by the climate.

Relief

Slopes in Livingston County range from nearly level to steep. Differences in relief influence the formation of soils by affecting runoff and drainage. Drainage, through its effect on soil aeration, influences soil color.

On otherwise similar soils, the rate of surface runoff is greatest on the steeper slopes and lowest in nearly level or depressional areas. The steeper soils are commonly better drained than nearly level or depressional soils, partly because more water runs off and less is absorbed by the soil.

In well drained soils, the iron and aluminum compounds that give most soils their color are oxidized and brightly colored. Poorly aerated soils are dull gray and mottled. Jasper soils are well drained, and Rantoul soils are very poorly drained.

Time

The length of time necessary for the formation of a soil depends on the other factors of soil formation. Soils that formed in material low in content of lime develop more rapidly and become more acid than soils that formed in material high in content of lime. The more permeable soils form more rapidly than the less permeable soils because lime and other soluble minerals are leached at a faster rate. Soils form more rapidly under prairie vegetation than under forest vegetation because the grasses are able to recycle calcium and other bases from the subsoil more efficiently. Soils form much more rapidly under a humid climate than under a dry climate.

Differences in the length of time that the parent material has been in place are commonly reflected in the degree of profile development in the soil.

On the more sloping parts of the landscape, erosion may remove the surface soil material at about the same rate as the rate of soil formation. Thus, the soils in these areas are immature, or young, even though the slopes have been exposed to weathering for thousands of years. Chatsworth soils are examples of young soils.

Soils on flood plains receive alluvial material during each flood. This pattern causes soil formation to start over with each new deposition. Sawmill soils are examples of soils that formed in alluvial material.

The kind of parent material can cause differences between soils that have been exposed to weathering for the same amount of time. For example, Clarence soils, which formed in fine textured material, have less distinct horizons and have carbonates closer to the surface than Brenton soils, which formed in medium textured loess and outwash. The differences are caused by a slower rate of water movement through the fine textured Clarence soils.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water

from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a

gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a

strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles

deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth

from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Pontiac, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	31.3	15.0	23.1	59	-14	0	1.58	0.68	2.35	3	7.1
February----	36.6	19.8	28.2	62	-10	1	1.27	.65	1.80	3	4.9
March-------	47.5	29.0	38.3	76	4	24	2.47	1.39	3.43	6	4.3
April-------	63.6	41.2	52.4	85	23	158	3.89	2.09	5.47	7	.6
May---------	74.5	51.2	62.8	92	32	406	3.66	1.99	5.13	7	.0
June--------	83.2	60.8	72.0	96	44	660	4.22	1.97	6.16	6	.0
July--------	85.7	64.5	75.1	97	50	769	4.46	2.93	5.86	6	.0
August------	83.7	62.6	73.1	95	47	711	2.83	1.22	4.21	5	.0
September---	78.3	55.3	66.8	94	36	502	3.33	1.19	5.11	5	.0
October-----	66.9	44.0	55.4	87	24	219	2.30	.79	3.55	4	.1
November----	50.1	32.3	41.2	75	8	38	1.83	1.11	2.47	4	2.4
December----	36.7	21.8	29.2	64	-8	3	2.01	.89	2.96	5	5.1
Yearly:											
Average---	61.5	41.5	51.5	---	---	---	---	---	---	---	---
Extreme---	108	-24	---	99	-15	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,490	33.85	28.45	38.62	61	24.5

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Pontiac, Illinois)

Probability	Temperature 24 °F or lower	Temperature 28 °F or lower	Temperature 32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 11	Apr. 21	May 3
2 years in 10 later than--	Apr. 6	Apr. 16	Apr. 29
5 years in 10 later than--	Mar. 27	Apr. 7	Apr. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 25	Oct. 13	Oct. 6
2 years in 10 earlier than--	Oct. 29	Oct. 19	Oct. 11
5 years in 10 earlier than--	Nov. 6	Oct. 29	Oct. 20

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Pontiac, Illinois)

Probability	Daily minimum temperature during growing season: Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	193	182	163
8 years in 10	200	188	169
5 years in 10	215	200	181
2 years in 10	229	212	192
1 year in 10	237	218	198

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
23A	Blount silt loam, 0 to 2 percent slopes	474	0.1
23B	Blount silt loam, 2 to 4 percent slopes	739	0.1
25E	Hennepin silt loam, 12 to 20 percent slopes	1,072	0.2
25F	Hennepin silt loam, 20 to 35 percent slopes	544	0.1
59	Lisbon silt loam	7,149	1.1
60C2	La Rose loam, 5 to 10 percent slopes, eroded	518	0.1
67	Harpster silty clay loam	226	*
69	Milford silty clay loam	17,069	2.5
91A	Swygert silty clay loam, 0 to 2 percent slopes	29,462	4.4
91B	Swygert silty clay loam, 2 to 4 percent slopes	722	0.1
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded	30,863	4.6
102A	La Hogue loam, 0 to 2 percent slopes	5,891	0.9
125	Selma clay loam	9,918	1.5
131B	Alvin fine sandy loam, 1 to 5 percent slopes	247	*
132A	Starks silt loam, 0 to 2 percent slopes	2,188	0.3
134B	Camden silt loam, 2 to 5 percent slopes	721	0.1
141A	Wesley fine sandy loam, 0 to 2 percent slopes	321	*
142	Patton silty clay loam	28,255	4.2
145B	Saybrook silt loam, 2 to 5 percent slopes	5,610	0.8
146A	Elliott silt loam, 0 to 2 percent slopes	18,907	2.8
146B	Elliott silt loam, 2 to 4 percent slopes	425	0.1
146B2	Elliott silty clay loam, 2 to 4 percent slopes, eroded	17,946	2.7
146C2	Elliott silty clay loam, 4 to 7 percent slopes, eroded	995	0.1
147A	Clarence silty clay loam, 0 to 2 percent slopes	6,078	0.9
147B2	Clarence silty clay loam, 2 to 4 percent slopes, eroded	17,057	2.5
147C2	Clarence silty clay loam, 4 to 7 percent slopes, eroded	7,649	1.1
148B	Proctor silt loam, 2 to 5 percent slopes	359	0.1
149A	Brenton silt loam, 0 to 2 percent slopes	2,593	0.4
150B	Onarga fine sandy loam, 1 to 5 percent slopes	1,416	0.2
150C	Onarga fine sandy loam, 5 to 10 percent slopes	212	*
151A	Ridgeville fine sandy loam, 0 to 2 percent slopes	818	0.1
152	Drummer silty clay loam	15,071	2.3
153	Pella silty clay loam	2,300	0.3
189A	Martinton silt loam, 0 to 2 percent slopes	8,275	1.2
189B	Martinton silt loam, 2 to 5 percent slopes	1,156	0.2
192A	Del Rey silt loam, 0 to 2 percent slopes	884	0.1
206	Thorp silt loam	425	0.1
223B2	Varna silty clay loam, 2 to 4 percent slopes, eroded	1,754	0.3
223C2	Varna silty clay loam, 4 to 9 percent slopes, eroded	2,400	0.4
228A	Nappanee silt loam, 0 to 2 percent slopes	491	0.1
228B	Nappanee silt loam, 2 to 4 percent slopes	449	0.1
228C	Nappanee silt loam, 4 to 9 percent slopes	276	*
229	Monee silt loam	677	0.1
230	Rowe silty clay	15,179	2.3
232	Ashkum silty clay loam	111,406	16.6
235	Bryce silty clay	74,980	11.2
238	Rantoul silty clay	935	0.1
241C	Chatsworth silty clay, 4 to 10 percent slopes	1,372	0.2
241D	Chatsworth silty clay, 10 to 20 percent slopes	300	*
293A	Andres loam, 0 to 2 percent slopes	26,496	4.0
294B	Symerton silt loam, 2 to 4 percent slopes	5,938	0.9
294B2	Symerton loam, 2 to 4 percent slopes, eroded	8,897	1.3
294C2	Symerton silt loam, 4 to 9 percent slopes, eroded	627	0.1
295A	Mokena silt loam, 0 to 2 percent slopes	3,723	0.6
300	Westland clay loam	7,494	1.1
330	Peotone silty clay loam	1,957	0.3
375A	Rutland silty clay loam, 0 to 2 percent slopes	593	0.1
375B	Rutland silty clay loam, 2 to 5 percent slopes	488	0.1
398A	Wea loam, 0 to 2 percent slopes	4,466	0.7
398B	Wea loam, 2 to 5 percent slopes	984	0.1
435	Streator silty clay loam	645	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
440A	Jasper loam, 0 to 2 percent slopes	1,762	0.3
440B	Jasper loam, 2 to 5 percent slopes	2,504	0.4
440C2	Jasper loam, 5 to 10 percent slopes, eroded	292	*
443B	Barrington silt loam, 2 to 5 percent slopes	2,149	0.3
448B2	Mona silt loam, 2 to 5 percent slopes, eroded	4,212	0.6
448C2	Mona silt loam, 5 to 10 percent slopes, eroded	865	0.1
484	Harco silty clay loam	21,449	3.2
503A	Rockton silt loam, 0 to 2 percent slopes	295	*
536	Dumps, mine	44	*
539B	Wenona silt loam, loamy substratum, 2 to 5 percent slopes	1,144	0.2
539C2	Wenona silt loam, loamy substratum, 5 to 10 percent slopes, eroded	338	0.1
541B	Graymont silt loam, 2 to 5 percent slopes	8,201	1.2
542	Rooks silty clay loam	4,699	0.7
560E	St. Clair silty clay loam, 12 to 20 percent slopes	211	*
560F	St. Clair silty clay loam, 20 to 35 percent slopes	207	*
571A	Whitaker loam, 0 to 2 percent slopes	3,219	0.5
573B	Tuscola loam, 2 to 5 percent slopes	2,782	0.4
573C2	Tuscola loam, 5 to 10 percent slopes, eroded	380	0.1
594	Reddick clay loam	26,706	4.0
609	Crane loam	5,529	0.8
614A	Chenoa silty clay loam, 0 to 2 percent slopes	36,171	5.4
614B	Chenoa silty clay loam, 2 to 5 percent slopes	6,860	1.0
740	Darroch silt loam	5	*
803B	Orthents, 1 to 7 percent slopes	2,703	0.4
864	Pits, quarries	874	0.1
865	Pits, gravel	887	0.1
871E	Lenzburg silt loam, 12 to 30 percent slopes	212	*
3073	Ross loam, frequently flooded	597	0.1
3107	Sawmill silty clay loam, frequently flooded	5,865	0.9
3292	Wallkill silt loam, frequently flooded	972	0.1
3306	Allison silt loam, frequently flooded	228	*
3405	Zook silty clay loam, frequently flooded	2,692	0.4
3451	Lawson silt loam, frequently flooded	1,762	0.3
3776	Comfrey loam, frequently flooded	3,153	0.5
4103	Houghton muck, ponded	83	*
	Water	2,486	0.4
	Total	669,620	100.0

* Less than 0.05 percent. The combined extent of the soils assigned an asterisk in the "Percent" column is about 0.3 percent of the survey area.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
23A	Blount silt loam, 0 to 2 percent slopes (where drained)
23B	Blount silt loam, 2 to 4 percent slopes
59	Lisbon silt loam
67	Harpster silty clay loam (where drained)
69	Milford silty clay loam (where drained)
91A	Swygert silty clay loam, 0 to 2 percent slopes
91B	Swygert silty clay loam, 2 to 4 percent slopes
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded
102A	La Hogue loam, 0 to 2 percent slopes
125	Selma clay loam (where drained)
131B	Alvin fine sandy loam, 1 to 5 percent slopes
132A	Starks silt loam, 0 to 2 percent slopes (where drained)
141A	Wesley fine sandy loam, 0 to 2 percent slopes
142	Patton silty clay loam (where drained)
145B	Saybrook silt loam, 2 to 5 percent slopes
146A	Elliott silt loam, 0 to 2 percent slopes
146B	Elliott silt loam, 2 to 4 percent slopes
146B2	Elliott silty clay loam, 2 to 4 percent slopes, eroded
146C2	Elliott silty clay loam, 4 to 7 percent slopes, eroded
148B	Proctor silt loam, 2 to 5 percent slopes
149A	Brenton silt loam, 0 to 2 percent slopes
150B	Onarga fine sandy loam, 1 to 5 percent slopes
151A	Ridgeville fine sandy loam, 0 to 2 percent slopes
152	Drummer silty clay loam (where drained)
153	Pella silty clay loam (where drained)
189A	Martinton silt loam, 0 to 2 percent slopes
189B	Martinton silt loam, 2 to 5 percent slopes
192A	Del Rey silt loam, 0 to 2 percent slopes (where drained)
206	Thorp silt loam (where drained)
223B2	Varna silty clay loam, 2 to 4 percent slopes, eroded
228A	Nappanee silt loam, 0 to 2 percent slopes (where drained)
228B	Nappanee silt loam, 2 to 4 percent slopes
229	Monee silt loam (where drained)
230	Rowe silty clay (where drained)
232	Ashkum silty clay loam (where drained)
235	Bryce silty clay (where drained)
293A	Andres loam, 0 to 2 percent slopes
294B	Symerton silt loam, 2 to 4 percent slopes
294B2	Symerton loam, 2 to 4 percent slopes, eroded
295A	Mokena silt loam, 0 to 2 percent slopes
300	Westland clay loam (where drained)
330	Peotone silty clay loam (where drained)
375A	Rutland silty clay loam, 0 to 2 percent slopes
375B	Rutland silty clay loam, 2 to 5 percent slopes
398A	Wea loam, 0 to 2 percent slopes
398B	Wea loam, 2 to 5 percent slopes
435	Streator silty clay loam (where drained)
440A	Jasper loam, 0 to 2 percent slopes
440B	Jasper loam, 2 to 5 percent slopes
443B	Barrington silt loam, 2 to 5 percent slopes
448B2	Mona silt loam, 2 to 5 percent slopes, eroded
484	Harco silty clay loam
503A	Rockton silt loam, 0 to 2 percent slopes
539B	Wenona silt loam, loamy substratum, 2 to 5 percent slopes
541B	Graymont silt loam, 2 to 5 percent slopes
542	Rooks silty clay loam
571A	Whitaker loam, 0 to 2 percent slopes (where drained)
573B	Tuscola loam, 2 to 5 percent slopes

TABLE 5.--PRIME FARMLAND--Continued

Map symbol	Soil name
594	Reddick clay loam (where drained)
609	Crane loam
614A	Chenoa silty clay loam, 0 to 2 percent slopes
614B	Chenoa silty clay loam, 2 to 5 percent slopes
740	Darroch silt loam
3073	Ross loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3107	Sawmill silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3292	Wallkill silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3306	Allison silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3405	Zook silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3451	Lawson silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3776	Comfrey loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
23A------------- Blount	IIw	106	35	48	64	4.3	7.2
23B------------- Blount	IIe	105	35	47	63	4.3	7.1
25E------------- Hennepin	VIe	---	---	---	---	2.1	3.5
25F------------- Hennepin	VIe	---	---	---	---	---	---
59-------------- Lisbon	I	145	51	63	92	5.9	9.8
60C2------------ La Rose	IIIe	95	35	41	59	3.8	6.4
67-------------- Harpster	IIw	100	35	52	74	---	---
69-------------- Milford	IIw	131	48	56	81	---	---
91A------------- Swygert	IIw	114	39	51	73	4.5	7.5
91B------------- Swygert	IIe	113	39	50	72	4.5	7.4
91B2------------ Swygert	IIe	107	37	48	69	4.2	7.1
102A------------ La Hogue	I	129	43	56	80	5.2	8.6
125------------- Selma	IIw	136	44	53	76	---	---
131B------------ Alvin	IIe	97	33	48	---	4.3	7.1
132A------------ Starks	IIw	110	37	45	62	4.3	7.3
134B------------ Camden	IIe	124	39	54	71	5.0	8.3
141A------------ Wesley	IIw	112	36	48	74	4.4	7.3
142------------- Patton	IIw	148	48	56	78	---	---
145B------------ Saybrook	IIe	138	46	59	83	5.5	9.2

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
146A------------ Elliott	IIw	128	45	55	79	5.1	8.5
146B------------ Elliott	IIe	127	45	54	78	5.1	8.4
146B2----------- Elliott	IIe	115	43	50	71	4.6	7.7
146C2----------- Elliott	IIe	95	35	41	59	3.8	6.4
147A------------ Clarence	IIIw	90	31	42	59	3.7	6.1
147B2----------- Clarence	IIIe	83	29	39	55	3.4	5.6
147C2----------- Clarence	IIIe	65	23	31	43	2.7	4.4
148B------------ Proctor	IIe	143	44	58	87	5.4	9.1
149A------------ Brenton	I	160	47	62	91	5.9	9.8
150B------------ Onarga	IIe	109	36	48	73	4.2	7.0
150C------------ Onarga	IIIe	107	35	46	72	4.2	6.8
151A------------ Ridgeville	IIs	115	40	53	75	4.6	7.7
152------------- Drummer	IIw	154	51	61	83	---	---
153------------- Pella	IIw	120	41	48	67	---	---
189A------------ Martinton	IIw	130	45	57	84	5.3	8.8
189B------------ Martinton	IIe	128	45	56	83	5.2	8.7
192A------------ Del Rey	IIw	115	37	49	69	4.5	7.5
206------------- Thorp	IIw	110	38	44	63	---	---
223B2----------- Varna	IIe	120	40	51	72	4.7	7.8
223C2----------- Varna	IIIe	110	39	50	71	4.5	7.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
228A------------ Nappanee	IIIw	87	31	55	90	5.5	3.8
228B------------ Nappanee	IIIe	86	31	52	85	5.5	3.8
228C------------ Nappanee	IVe	84	30	48	80	5.2	3.6
229------------- Monee	IIIw	87	32	41	55	---	---
230------------- Rowe	IIIw	100	35	45	63	---	---
232------------- Ashkum	IIw	140	47	54	79	---	---
235------------- Bryce	IIw	115	38	48	70	---	---
238------------- Rantoul	IIIw	75	26	36	50	---	---
241C------------ Chatsworth	VIe	---	---	---	---	---	1.6
241D------------ Chatsworth	VIIe	---	---	---	---	---	1.0
293A------------ Andres	I	135	45	61	88	5.5	9.1
294B------------ Symerton	IIe	125	40	58	82	5.3	8.9
294B2----------- Symerton	IIe	120	38	57	80	5.2	8.6
294C2----------- Symerton	IIIe	115	37	55	78	5.1	8.5
295A------------ Mokena	IIw	126	41	55	77	4.7	7.8
300------------- Westland	IIw	130	45	56	76	---	---
330------------- Peotone	IIw	100	34	43	58	---	---
375A------------ Rutland	IIw	132	45	59	84	5.3	8.8
375B------------ Rutland	IIe	131	45	58	83	5.2	8.7
398A------------ Wea	I	120	42	48	80	4.0	8.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
398B----------- Wea	IIe	119	41	48	79	4.0	8.0
435------------ Streator	IIw	129	45	54	77	---	---
440A----------- Jasper	I	130	46	52	80	4.3	8.6
440B----------- Jasper	IIe	125	44	50	79	4.1	8.2
440C2---------- Jasper	IIIe	115	40	46	75	3.8	7.6
443B----------- Barrington	IIe	129	42	54	84	5.3	8.9
448B2---------- Mona	IIe	114	37	50	73	4.5	7.4
448C2---------- Mona	IIIe	108	35	48	70	4.2	7.1
484------------ Harco	I	154	47	62	87	5.6	9.3
503A----------- Rockton	IIs	100	38	72	80	4.2	7.0
536 Dumps							
539B----------- Wenona	IIe	130	44	54	78	5.0	8.4
539C2---------- Wenona	IIIe	124	42	52	74	4.8	8.0
541B----------- Graymont	IIe	138	46	59	83	5.5	9.2
542------------ Rooks	I	157	49	65	90	6.0	10.1
560E----------- St. Clair	VIe	---	---	---	---	---	---
560F----------- St. Clair	VIIe	---	---	---	---	---	---
571A----------- Whitaker	IIw	105	35	42	60	4.1	7.3
573B----------- Tuscola	IIe	100	32	47	80	4.8	3.2
573C2---------- Tuscola	IIIe	85	27	42	72	4.8	3.2

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
594------------- Reddick	IIw	141	48	56	81	5.3	8.9
609------------- Crane	IIw	120	40	---	---	---	---
614A------------ Chenoa	IIw	135	45	61	85	5.6	9.3
614B------------ Chenoa	IIe	134	44	60	84	5.5	9.2
740------------- Darroch	IIw	140	50	56	---	4.6	---
803B. Orthents							
864, 865. Pits							
871E------------ Lenzburg	VIe	---	---	---	---	2.5	---
3073------------ Ross	IIw	120	40	---	---	4.5	8.8
3107------------ Sawmill	IIIw	132	42	---	---	---	---
3292------------ Wallkill	IIIw	100	30	---	---	---	---
3306------------ Allison	IIw	104	34	---	---	4.0	8.5
3405------------ Zook	IIIw	92	32	---	---	---	---
3451------------ Lawson	IIIw	120	39	---	---	3.8	8.5
3776------------ Comfrey	IIIw	115	34	---	---	---	---
4103------------ Houghton	VIIIw	---	---	---	---	---	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
23A, 23B-------- Blount	3C	Slight	Slight	Severe	Severe	White oak-----------	65	3	Eastern white pine, Scotch pine, eastern redcedar, red pine, yellow-poplar.
						Northern red oak----	65	3	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
						Pin oak-------------	---	---	
25E, 25F-------- Hennepin	5R	Moderate	Moderate	Slight	Slight	Northern red oak----	85	5	Northern red oak, white oak, green ash, black walnut, eastern white pine, red pine, eastern redcedar.
						White oak-----------	---	---	
131B------------ Alvin	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak----	80	4	
						Black walnut--------	---	---	
						Yellow-poplar-------	90	6	
132A------------ Starks	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	White oak, yellow-poplar, sugar maple, American sycamore, green ash.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
142------------- Patton	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	85	5	Pin oak, sweetgum, eastern white pine, baldcypress, Norway spruce, red maple, white ash.
						White oak-----------	75	4	
						Sweetgum------------	80	6	
						Northern red oak----	75	4	
192A------------ Del Rey	4C	Slight	Slight	Severe	Severe	White oak-----------	70	4	Green ash, Austrian pine, eastern redcedar, pin oak, red maple.
						Northern red oak----	70	4	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
228A, 228B, 228C----------- Nappanee	5C	Slight	Slight	Severe	Severe	White oak-----------	75	5	Eastern white pine, baldcypress, white ash, red maple, yellow-poplar, American sycamore.
						Pin oak-------------	85	5	
						Sweetgum------------	80	6	
						American sycamore---	---	---	
300------------- Westland	5W	Slight	Severe	Severe	Severe	Pin oak-------------	85	5	Sweetgum, eastern white pine, baldcypress, red maple, white ash.
						Sweetgum------------	90	7	
						White oak-----------	75	4	
560E, 560F------ St. Clair	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	66	3	Eastern white pine, yellow-poplar.
						White oak-----------	62	3	
						White ash-----------	---	---	
						Sugar maple---------	---	---	
571A------------ Whitaker	4A	Slight	Slight	Slight	Slight	White oak-----------	70	4	Yellow-poplar, eastern white pine, baldcypress, white ash, red maple, American sycamore.
						Pin oak-------------	85	5	
						Yellow-poplar-------	85	6	
						Sweetgum------------	80	6	
						Northern red oak----	75	4	
573B, 573C2----- Tuscola	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	5	Northern red oak, black walnut, white ash, yellow-poplar, eastern white pine, Austrian pine, red pine.
						Black walnut--------	---	---	
						White ash-----------	---	---	
						American basswood---	---	---	
						White oak-----------	---	---	
						Sugar maple---------	---	---	
						Yellow-poplar-------	---	---	
871E------------ Lenzburg	5R	Moderate	Moderate	Slight	Slight	Sweetgum------------	76	5	Black walnut, eastern cottonwood, green ash, white ash.
						Black walnut--------	73	---	
						Eastern cottonwood--	---	---	
3073------------ Ross	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	5	Eastern white pine, black walnut, white ash, Norway spruce, yellow-poplar.
						Yellow-poplar-------	96	7	
						Sugar maple---------	85	4	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash-----------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
3107------------ Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	5	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3292------------ Wallkill	2W	Slight	Severe	Severe	Severe	Silver maple--------	70	2	---
						Black willow--------	---	---	
3451------------ Lawson	2W	Slight	Moderate	Slight	Slight	Silver maple--------	70	2	White spruce, silver maple, white ash.
						White ash-----------	---	---	
						Red maple-----------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
23A, 23B. Blount	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar, silky dogwood.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
25E, 25F. Hennepin	Eastern redcedar, Osage-orange, Russian-olive, jack pine, Washington hawthorn, gray dogwood, silky dogwood, Amur privet, American cranberrybush.	Honeylocust, northern catalpa.	---	---
59. Lisbon	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
60C2. La Rose	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
67. Harpster	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osage-orange.	Black willow	---
69. Milford	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
91A, 91B, 91B2. Swygert	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak	---
102A. La Hogue	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
125. Selma	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
131B: Alvin	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
132A: Starks	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
134B: Camden	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
141A: Wesley	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
142: Patton	Amur privet, silky dogwood, American cranberrybush, Amur honeysuckle.	White fir, northern whitecedar, blue spruce, Austrian pine, Washington hawthorn, Norway spruce.	Eastern white pine	Pin oak.
145B: Saybrook	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
146A, 146B: Elliott	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
146B2, 146C2: Elliott	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
147A, 147B2, 147C2: Clarence	Eastern redcedar, American cranberrybush, Amur privet, Washington hawthorn, Amur honeysuckle, autumn-olive, silky dogwood.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
148B: Proctor	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
149A: Brenton	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
150B-------------- Onarga	Amur honeysuckle, Amur privet, American cranberrybush, Washington hawthorn, silky dogwood.	Austrian pine, Osage-orange, eastern redcedar, northern whitecedar.	Eastern white pine, Norway spruce, red pine.	---
150C-------------- Onarga	Amur privet, Washington hawthorn, American cranberrybush, Amur honeysuckle, silky dogwood.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Red pine, Norway spruce, eastern white pine.	---
151A-------------- Ridgeville	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
152--------------- Drummer	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine----	Pin oak.
153--------------- Pella	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
189A, 189B-------- Martinton	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
192A-------------- Del Rey	Amur privet, arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
206--------------- Thorp	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
223B2, 223C2------ Varna	Eastern redcedar, Washington hawthorn, Amur honeysuckle, Amur privet, arrowwood, silky dogwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
228A, 228B, 228C-- Nappanee	Eastern redcedar, Washington hawthorn, Amur privet, American cranberrybush, arrowwood, Amur honeysuckle.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
229-- Monee	American cranberrybush, Amur privet, Amur honeysuckle, silky dogwood.	Norway spruce, Washington hawthorn, Austrian pine, blue spruce, white fir, northern whitecedar.	Eastern white pine----	Pin oak.
230-- Rowe	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern whitecedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
232-- Ashkum	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
235-- Bryce	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
238-- Rantoul	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
241C, 241D-- Chatsworth	Eastern redcedar------	Virginia pine, Austrian pine.	---	---
293A-- Andres	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
294B. Symerton				
294B2-- Symerton	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, white fir, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
294C2. Symerton				
295A-- Mokena	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
300--------------- Westland	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
330--------------- Peotone	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
375A, 375B-------- Rutland	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
398A, 398B-------- Wea	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
435--------------- Streator	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
440A, 440B, 440C2- Jasper	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
443B-------------- Barrington	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
448B2, 448C2------ Mona	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, Washington hawthorn, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
484--------------- Harco	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce---------	Pin oak, eastern white pine.
503A-------------- Rockton	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, silky dogwood.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
536. Dumps				
539B, 539C2------- Wenona	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, gray dogwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
541B-------------- Graymont	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Pin oak, Norway spruce, Austrian pine.	Eastern white pine.
542--------------- Rooks	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Blue spruce, white fir, northern whitecedar, Austrian pine, Washington hawthorn.	Norway spruce---------	Eastern white pine.
560E, 560F-------- St. Clair	Arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
571A-------------- Whitaker	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, Austrian pine, blue spruce, Washington hawthorn, northern whitecedar.	Norway spruce---------	Eastern white pine, pin oak.
573B, 573C2------- Tuscola	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---
594--------------- Reddick	Washington hawthorn, nannyberry viburnum, silky dogwood.	Osage-orange, green ash, eastern redcedar, northern whitecedar, white spruce.	Black willow----------	---
609--------------- Crane	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
614A, 614B-------- Chenoa	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	White fir, northern whitecedar, blue spruce, Austrian pine, Washington hawthorn.	Norway spruce---------	Eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
740 Darroch	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
803B. Orthents				
864, 865. Pits				
871E Lenzburg	Eastern redcedar, jack pine, Russian-olive, Washington hawthorn, Osage-orange.	Honeylocust, northern catalpa.	---	---
3073 Ross	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
3107 Sawmill	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3292 Wallkill	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, white fir, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3306 Allison	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3405 Zook	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Norway spruce, northern whitecedar, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3451 Lawson	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3776 Comfrey	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
4103. Houghton				

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23A, 23B: Blount	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
25E: Hennepin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
25F: Hennepin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
59: Lisbon	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
60C2: La Rose	Slight	Slight	Severe: slope.	Slight	Slight.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
69: Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
91A, 91B, 91B2: Swygert	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
102A: La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
125: Selma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
131B: Alvin	Slight	Slight	Moderate: slope.	Slight	Slight.
132A: Starks	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
134B: Camden	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
141A: Wesley	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
142: Patton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
145B: Saybrook	Slight	Slight	Moderate: slope.	Slight	Slight.
146A, 146B, 146B2, 146C2: Elliott	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
147A, 147B2, 147C2 Clarence	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
148B Proctor	Slight	Slight	Moderate: slope.	Slight	Slight.
149A Brenton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
150B Onarga	Slight	Slight	Moderate: slope.	Slight	Slight.
150C Onarga	Slight	Slight	Severe: slope.	Slight	Slight.
151A Ridgeville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
152 Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
153 Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
189A, 189B Martinton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
192A Del Rey	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
206 Thorp	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
223B2 Varna	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Moderate: large stones.
223C2 Varna	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Moderate: large stones.
228A, 228B Nappanee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
228C Nappanee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, droughty.
229 Monee	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
230 Rowe	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
232-------------------- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
235-------------------- Bryce	Severe: ponding, too clayey.	Severe: ponding, too clayey.	Severe: too clayey, ponding.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
238-------------------- Rantoul	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
241C------------------- Chatsworth	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: droughty, too clayey.
241D------------------- Chatsworth	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: droughty, slope, too clayey.
293A------------------- Andres	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
294B, 294B2------------ Symerton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
294C2------------------ Symerton	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight----------	Slight.
295A------------------- Mokena	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
300-------------------- Westland	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
330-------------------- Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
375A, 375B------------- Rutland	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
398A------------------- Wea	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
398B------------------- Wea	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
435-------------------- Streator	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
440A------------------- Jasper	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
440B------------------- Jasper	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
440C2: Jasper	Slight	Slight	Severe: slope.	Slight	Slight.
443B: Barrington	Slight	Slight	Moderate: slope.	Slight	Slight.
448B2: Mona	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.	Slight.
448C2: Mona	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
484: Harco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
503A: Rockton	Slight	Slight	Slight	Slight	Moderate: depth to rock.
536. Dumps					
539B: Wenona	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
539C2: Wenona	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
541B: Graymont	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
542: Rooks	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
560E: St. Clair	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
560F: St. Clair	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
571A: Whitaker	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
573B: Tuscola	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
573C2: Tuscola	Moderate: wetness.	Moderate: wetness.	Severe: slope.	Slight	Slight.
594: Reddick	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
609: Crane	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
614A, 614B: Chenoa	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
740: Darroch	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
803B: Orthents	Slight	Slight	Moderate: slope.	Slight	Slight.
864, 865. Pits					
871E: Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
3073: Ross	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3107: Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3292: Wallkill	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, flooding.
3306: Allison	Severe: flooding.	Moderate: flooding.	Slight	Moderate: flooding.	Severe: flooding.
3405: Zook	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3451: Lawson	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3776: Comfrey	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
4103: Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
23A: Blount	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
23B: Blount	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25E: Hennepin	Poor	Fair	Good	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
25F: Hennepin	Very poor	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Good	Very poor.
59: Lisbon	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
60C2: La Rose	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
67: Harpster	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Fair.
69: Milford	Good	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
91A, 91B, 91B2: Swygert	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
102A: La Hogue	Good	Good	Good	Good	Fair	Fair	Poor	Good	Good	Poor.
125: Selma	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
131B: Alvin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
132A: Starks	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
134B: Camden	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
141A: Wesley	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
142: Patton	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
145B: Saybrook	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
146A: Elliott	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
146B, 146B2, 146C2- Elliott	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
147A--------------- Clarence	Fair	Good	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
147B2, 147C2------- Clarence	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
148B--------------- Proctor	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
149A--------------- Brenton	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
150B--------------- Onarga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
150C--------------- Onarga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
151A--------------- Ridgeville	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
152---------------- Drummer	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
153---------------- Pella	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
189A--------------- Martinton	Fair	Good	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
189B--------------- Martinton	Fair	Good	Fair	Good	Good	Fair	Poor	Fair	Good	Poor.
192A--------------- Del Rey	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
206---------------- Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.
223B2-------------- Varna	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
223C2-------------- Varna	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
228A--------------- Nappanee	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
228B--------------- Nappanee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
228C--------------- Nappanee	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
229---------------- Monee	Poor	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
230----------------Rowe	Poor	Fair	Poor	Fair	Fair	Poor	Good	Fair	Fair	Fair.
232----------------Ashkum	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
235----------------Bryce	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
238----------------Rantoul	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
241C, 241D---------Chatsworth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
293A---------------Andres	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
294B, 294B2--------Symerton	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
294C2--------------Symerton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
295A---------------Mokena	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
300----------------Westland	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
330----------------Peotone	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
375A---------------Rutland	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
375B---------------Rutland	Good	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
398A, 398B---------Wea	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
435----------------Streator	Good	Good	Good	Good	Good	Good	Good	Good	Good	Fair.
440A, 440B---------Jasper	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
440C2--------------Jasper	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
443B---------------Barrington	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
448B2, 448C2-------Mona	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
484----------------Harco	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
503A. Rockton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
536. Dumps										
539B, 539C2. Wenona	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
541B. Graymont	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
542. Rooks	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
560E. St. Clair	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
560F. St. Clair	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
571A. Whitaker	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
573B. Tuscola	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
573C2. Tuscola	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
594. Reddick	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Poor.
609. Crane	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
614A, 614B. Chenoa	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
740. Darroch	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
803B. Orthents										
864, 865. Pits										
871E. Lenzburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
3073. Ross	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3107. Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3292. Wallkill	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
3306--------------- Allison	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
3405--------------- Zook	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good.
3451--------------- Lawson	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
3776--------------- Comfrey	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
4103--------------- Houghton	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
23A, 23B---------- Blount	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
25E, 25F---------- Hennepin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
59---------------- Lisbon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
60C2-------------- La Rose	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
67---------------- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
69---------------- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
91A, 91B, 91B2---- Swygert	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness, droughty.
102A-------------- La Hogue	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
125--------------- Selma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
131B-------------- Alvin	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Moderate: frost action.	Slight.
132A-------------- Starks	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
134B-------------- Camden	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
141A-------------- Wesley	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
142--------------- Patton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
145B: Saybrook	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: low strength, frost action.	Slight.
146A, 146B, 146B2, 146C2: Elliott	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
147A, 147B2, 147C2: Clarence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
148B: Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
149A: Brenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
150B: Onarga	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
150C: Onarga	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Slight.
151A: Ridgeville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
152: Drummer	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
153: Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
189A, 189B: Martinton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
192A: Del Rey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
206: Thorp	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
223B2: Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Moderate: large stones.
223C2: Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Moderate: large stones.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
228A, 228B, 228C-- Nappanee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness, droughty.
229--------------- Monee	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
230--------------- Rowe	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
232--------------- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
235--------------- Bryce	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, too clayey.
238--------------- Rantoul	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
241C-------------- Chatsworth	Moderate: too clayey, dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Severe: droughty, too clayey.
241D-------------- Chatsworth	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: droughty, slope, too clayey.
293A-------------- Andres	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
294B, 294B2------- Symerton	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
294C2------------- Symerton	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
295A-------------- Mokena	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
300--------------- Westland	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
330----------------- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
375A, 375B--------- Rutland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
398A, 398B--------- Wea	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
435----------------- Streator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
440A, 440B--------- Jasper	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Moderate: low strength, frost action.	Slight.
440C2-------------- Jasper	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Moderate: low strength, frost action.	Slight.
443B--------------- Barrington	Moderate: wetness.	Slight----------	Moderate: wetness.	Slight----------	Severe: frost action.	Slight.
448B2-------------- Mona	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
448C2-------------- Mona	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
484----------------- Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
503A--------------- Rockton	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Moderate: depth to rock.
536. Dumps						
539B--------------- Wenona	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
539C2-------------- Wenona	Moderate: too clayey, wetness, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
541B--------------- Graymont	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
542 Rooks	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
560E, 560F St. Clair	Severe: wetness, slope.	Severe: shrink-swell, slope.	Severe: wetness, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
571A Whitaker	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
573B Tuscola	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Slight.
573C2 Tuscola	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action.	Slight.
594 Reddick	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
609 Crane	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
614A, 614B Chenoa	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
740 Darroch	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
803B Orthents	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
864, 865. Pits						
871E Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
3073 Ross	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3107 Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3292-------------- Wallkill	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
3306-------------- Allison	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3405-------------- Zook	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
3451-------------- Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3776-------------- Comfrey	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
4103-------------- Houghton	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
23A, 23B: Blount	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
25E, 25F: Hennepin	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
59: Lisbon	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
60C2: La Rose	Moderate: percs slowly.	Severe: slope.	Slight	Slight	Good.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
69: Milford	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
91A: Swygert	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
91B, 91B2: Swygert	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
102A: La Hogue	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
125: Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
131B: Alvin	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage.
132A: Starks	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
134B: Camden	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
141A---------------- Wesley	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
142----------------- Patton	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
145B---------------- Saybrook	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
146A, 146B, 146B2, 146C2-------------- Elliott	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
147A---------------- Clarence	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
147B2, 147C2-------- Clarence	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
148B---------------- Proctor	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
149A---------------- Brenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
150B---------------- Onarga	Severe: poor filter, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: wetness, thin layer.
150C---------------- Onarga	Severe: wetness, poor filter.	Severe: wetness, seepage, slope.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, thin layer.
151A---------------- Ridgeville	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness.	Poor: seepage, too sandy, wetness.
152----------------- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
153----------------- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
189A, 189B---------- Martinton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
192A Del Rey	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
206 Thorp	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
223B2, 223C2 Varna	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
228A Nappanee	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
228B, 228C Nappanee	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
229 Monee	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
230 Rowe	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
232 Ashkum	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, ponding.
235 Bryce	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
238 Rantoul	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
241C Chatsworth	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
241D Chatsworth	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
293A Andres	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
294B, 294B2, 294C2-- Symerton	Severe: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
295A---------------- Mokena	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
300----------------- Westland	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
330----------------- Peotone	Severe: ponding, percs slowly.	Slight-----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
375A---------------- Rutland	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
375B---------------- Rutland	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
398A, 398B---------- Wea	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-----------	Poor: small stones.
435----------------- Streator	Severe: ponding, wetness, percs slowly.	Severe: ponding, wetness.	Severe: ponding, wetness, too clayey.	Severe: ponding, wetness.	Poor: too clayey, hard to pack, wetness.
440A---------------- Jasper	Slight-----------	Moderate: seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey, thin layer.
440B---------------- Jasper	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, thin layer.
440C2--------------- Jasper	Slight-----------	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, thin layer.
443B---------------- Barrington	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
448B2--------------- Mona	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: thin layer.
448C2--------------- Mona	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: thin layer.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
484 Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
503A Rockton	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
536. Dumps					
539B Wenona	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
539C2 Wenona	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
541B Graymont	Severe: percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Poor: hard to pack.
542 Rooks	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
560E, 560F St. Clair	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
571A Whitaker	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
573B Tuscola	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy.
573C2 Tuscola	Severe: wetness.	Severe: slope, wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy.
594 Reddick	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
609 Crane	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
614A Chenoa	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
614B Chenoa	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
740 Darroch	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
803B----------------- Orthents	Moderate: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Good.
864, 865. Pits					
871E----------------- Lenzburg	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
3073----------------- Ross	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
3107----------------- Sawmill	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3292----------------- Wallkill	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, excess humus.
3306----------------- Allison	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
3405----------------- Zook	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
3451----------------- Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3776----------------- Comfrey	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
4103----------------- Houghton	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
23A, 23B Blount	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
25E Hennepin	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
25F Hennepin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
59 Lisbon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
60C2 La Rose	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
67 Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
69 Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
91A, 91B, 91B2 Swygert	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
102A La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
125 Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
131B Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
132A Starks	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
134B Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
141A Wesley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
142 Patton	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
145B: Saybrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
146A, 146B, 146B2, 146C2: Elliott	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
147A, 147B2, 147C2: Clarence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
148B: Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
149A: Brenton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
150B: Onarga	Fair: wetness.	Probable	Improbable: too sandy.	Good.
150C: Onarga	Good	Probable	Improbable: too sandy.	Fair: area reclaim, thin layer.
151A: Ridgeville	Fair: wetness.	Probable	Improbable: too sandy.	Good.
152: Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
153: Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
189A, 189B: Martinton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
192A: Del Rey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
206: Thorp	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
223B2, 223C2: Varna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
228A, 228B, 228C: Nappanee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
229: Monee	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
230: Rowe	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
232: Ashkum	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
235: Bryce	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
238: Rantoul	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
241C: Chatsworth	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
241D: Chatsworth	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
293A: Andres	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
294B, 294B2, 294C2: Symerton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
295A: Mokena	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
300: Westland	Poor: wetness.	Probable	Probable	Poor: area reclaim, wetness.
330: Peotone	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
375A, 375B: Rutland	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
398A, 398B: Wea	Good	Probable	Probable	Poor: small stones, area reclaim.
435: Streator	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
440A, 440B, 440C2: Jasper	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
443B: Barrington	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
448B2, 448C2: Mona	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
484 Harco	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
503A Rockton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones.
536. Dumps				
539B, 539C2 Wenona	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
541B Graymont	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
542 Rooks	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
560E St. Clair	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
560F St. Clair	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
571A Whitaker	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
573B, 573C2 Tuscola	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
594 Reddick	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
609 Crane	Fair: wetness.	Probable	Probable	Poor: area reclaim.
614A, 614B Chenoa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
740 Darroch	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
803B Orthents	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
864, 865. Pits				
871E Lenzburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
3073------------------- Ross	Good.	Improbable: excess fines.	Improbable: excess fines.	Good.
3107------------------- Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3292------------------- Wallkill	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3306------------------- Allison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3405------------------- Zook	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3451------------------- Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
3776------------------- Comfrey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
4103------------------- Houghton	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
23A Blount	Slight	Moderate: piping, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
23B Blount	Moderate: slope.	Moderate: piping, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
25E, 25F Hennepin	Severe: slope.	Severe: piping.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
59 Lisbon	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
60C2 La Rose	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
67 Harpster	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
69 Milford	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.
91A Swygert	Slight	Moderate: hard to pack, wetness.	Percs slowly, frost action.	Wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
91B, 91B2 Swygert	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
102A La Hogue	Severe: seepage.	Severe: thin layer, wetness.	Frost action	Wetness	Wetness	Wetness, rooting depth.
125 Selma	Severe: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
131B Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
132A Starks	Moderate: seepage.	Severe: thin layer, wetness.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
134B Camden	Severe: seepage.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
141A Wesley	Severe: seepage.	Moderate: piping, wetness.	Frost action	Wetness	Erodes easily, wetness, soil blowing.	Wetness, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
142--------------- Patton	Moderate: seepage.	Severe: hard to pack, ponding.	Ponding, frost action.	Ponding--------	Erodes easily, ponding.	Wetness, erodes easily.
145B-------------- Saybrook	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
146A-------------- Elliott	Slight---------	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
146B, 146B2, 146C2 Elliott	Moderate: slope.	Severe: wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
147A-------------- Clarence	Slight---------	Moderate: hard to pack, wetness.	Percs slowly---	Wetness, droughty.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
147B2, 147C2------ Clarence	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, droughty.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
148B-------------- Proctor	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Erodes easily, too sandy.	Erodes easily.
149A-------------- Brenton	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Wetness--------	Wetness.
150B-------------- Onarga	Severe: seepage.	Severe: piping.	Slope----------	Slope, wetness, soil blowing.	Wetness, soil blowing.	Favorable.
150C-------------- Onarga	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
151A-------------- Ridgeville	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
152--------------- Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
153--------------- Pella	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
189A-------------- Martinton	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
189B-------------- Martinton	Moderate: slope.	Severe: wetness.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Wetness, erodes easily.
192A-------------- Del Rey	Slight---------	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
206--------------- Thorp	Severe: seepage.	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
223B2, 223C2------ Varna	Moderate: slope.	Moderate: hard to pack.	Deep to water	Slope, percs slowly.	Favorable------	Favorable.
228A------------- Nappanee	Slight---------	Moderate: hard to pack, wetness.	Percs slowly---	Wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
228B, 228C-------- Nappanee	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
229--------------- Monee	Slight---------	Severe: ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
230--------------- Rowe	Slight---------	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
232--------------- Ashkum	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
235--------------- Bryce	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
238--------------- Rantoul	Slight---------	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
241C-------------- Chatsworth	Moderate: slope.	Moderate: hard to pack.	Deep to water	Slope, droughty, slow intake.	Percs slowly---	Droughty.
241D-------------- Chatsworth	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope, droughty, slow intake.	Slope, percs slowly.	Slope, droughty.
293A-------------- Andres	Moderate: seepage.	Severe: hard to pack.	Frost action---	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
294B, 294B2, 294C2------------ Symerton	Moderate: seepage, slope.	Moderate: wetness.	Deep to water	Slope----------	Erodes easily	Erodes easily.
295A-------------- Mokena	Slight---------	Moderate: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
300--------------- Westland	Severe: seepage.	Severe: thin layer, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
330--------------- Peotone	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
375A-------------- Rutland	Slight---------	Severe: wetness.	Frost action---	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
375B Rutland	Moderate: slope.	Severe: wetness.	Frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
398A Wea	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Favorable	Favorable.
398B Wea	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
435 Streator	Slight	Severe: wetness.	Frost action	Wetness, percs slowly.	Wetness	Wetness.
440A Jasper	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Favorable	Favorable.
440B, 440C2 Jasper	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
443B Barrington	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
448B2, 448C2 Mona	Moderate: slope.	Moderate: piping, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
484 Harco	Moderate: seepage.	Severe: thin layer, wetness.	Frost action	Wetness	Wetness	Wetness.
503A Rockton	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Depth to rock	Depth to rock	Depth to rock.
536. Dumps						
539B Wenona	Moderate: slope.	Moderate: hard to pack.	Deep to water	Slope, percs slowly.	Favorable	Percs slowly.
539C2 Wenona	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope, percs slowly.	Slope	Slope, percs slowly.
541B Graymont	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Deep to water	Slope, percs slowly, rooting depth.	Erodes easily, percs slowly.	Erodes easily, rooting depth.
542 Rooks	Moderate: seepage.	Severe: piping, wetness.	Frost action	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
560E, 560F St. Clair	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
571A Whitaker	Severe: seepage.	Severe: piping, wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
573B, 573C2 Tuscola	Moderate: seepage, slope.	Severe: piping.	Frost action, slope, cutbanks cave.	Slope, wetness.	Wetness, too sandy.	Favorable.
594 Reddick	Moderate: seepage.	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
609 Crane	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
614A Chenoa	Moderate: seepage.	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
614B Chenoa	Moderate: seepage, slope.	Severe: wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
740 Darroch	Moderate: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness	Erodes easily, wetness, too sandy.	Wetness, erodes easily.
803B Orthents	Moderate: seepage, slope.	Slight	Deep to water	Slope, droughty.	Soil blowing	Droughty.
864, 865. Pits						
871E Lenzburg	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
3073 Ross	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
3107 Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
3292 Wallkill	Severe: seepage.	Severe: excess humus, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3306 Allison	Moderate: seepage.	Severe: hard to pack.	Deep to water	Flooding	Favorable	Favorable.
3405 Zook	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3451 Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3776 Comfrey	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
4103 Houghton	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding	Ponding	Wetness.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
23A----------- Blount	0-13	Silt loam-----	CL	A-6, A-4	0	0-5	95-100	95-100	90-100	80-95	25-40	8-20
	13-26	Silty clay loam, silty clay, clay loam.	CH, CL	A-7, A-6	0-1	0-5	95-100	90-100	80-90	75-85	35-60	15-35
	26-32	Silty clay loam, clay loam.	CL, CH, ML, MH	A-6, A-7	0-1	0-5	95-100	90-100	80-90	70-90	35-55	10-30
	32-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-10	90-100	90-100	80-100	70-90	30-45	10-25
23B----------- Blount	0-10	Silt loam-----	CL	A-6, A-4	0	0-5	95-100	95-100	90-100	80-95	25-40	8-20
	10-28	Silty clay loam, silty clay, clay loam.	CH, CL	A-7, A-6	0-1	0-5	95-100	90-100	80-90	75-85	35-60	15-35
	28-34	Silty clay loam, clay loam.	CL, CH, ML, MH	A-6, A-7	0-1	0-5	95-100	90-100	80-90	70-90	35-55	10-30
	34-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-10	90-100	90-100	80-100	70-90	30-45	10-25
25E----------- Hennepin	0-5	Silt loam-----	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	90-100	85-100	70-100	60-95	25-45	5-20
	5-19	Loam, clay loam, silt loam.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
	19-60	Loam, clay loam, silt loam.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
25F----------- Hennepin	0-5	Silt loam-----	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	90-100	85-100	70-100	60-95	25-45	5-20
	5-18	Loam, clay loam, silt loam.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
	18-60	Loam, clay loam, silt loam.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
59------------ Lisbon	0-13	Silt loam-----	ML	A-6, A-7	0	0	100	100	95-100	80-95	35-50	10-20
	13-37	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	0	100	95-100	95-100	80-98	35-55	15-35
	37-41	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	0-5	90-100	90-100	85-100	60-85	20-45	8-25
	41-60	Loam, silt loam.	CL	A-6, A-4	0	0-3	90-100	90-100	85-100	60-85	20-40	8-20
60C2---------- La Rose	0-7	Loam----------	CL	A-6, A-4	0	0	100	95-100	90-100	60-95	30-40	8-15
	7-18	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	60-85	30-45	15-25
	18-60	Loam, silt loam.	CL	A-6	0	0-5	95-100	90-100	75-100	50-80	25-40	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
67------------ Harpster	0-16	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	45-60	20-35
	16-35	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	85-100	40-60	20-35
	35-44	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	70-100	35-55	20-35
	44-60	Stratified sandy loam to clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0	100	95-100	95-100	45-95	20-50	5-25
69------------ Milford	0-21	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	90-100	75-95	40-55	20-30
	21-43	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	0	100	95-100	90-100	75-100	40-60	20-40
	43-60	Stratified clay to sandy loam.	CL, SC	A-6, A-7	0	0	95-100	95-100	90-100	45-100	25-50	10-30
91A----------- Swygert	0-14	Silty clay loam.	CL	A-7, A-6	0	0	100	95-100	95-100	85-95	35-50	15-25
	14-21	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	85-95	35-55	15-30
	21-37	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	37-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	0-5	95-100	95-100	90-100	75-95	40-65	20-40
91B----------- Swygert	0-11	Silty clay loam.	CL	A-7, A-6	0	0	100	95-100	95-100	85-95	35-50	15-25
	11-20	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	85-95	35-55	15-30
	20-40	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	40-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	0-5	95-100	95-100	90-100	75-95	40-65	20-40
91B2---------- Swygert	0-12	Silty clay loam.	CL	A-7, A-6	0	0	100	95-100	95-100	85-95	35-50	15-25
	12-17	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	85-95	35-55	15-30
	17-39	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	39-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	0-5	95-100	95-100	90-100	75-95	40-65	20-40

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
102A---------- La Hogue	0-16	Loam----------	ML, CL, CL-ML	A-4	0	0	100	95-100	80-100	50-80	20-35	3-10
	16-26	Sandy clay loam, silty clay loam, clay loam.	CL, SC	A-6, A-4	0	0	100	100	80-100	40-85	25-40	8-20
	26-33	Sandy loam, loamy sand, silt loam.	ML, CL, SM, SC	A-2, A-4, A-6	0	0	100	90-100	75-90	15-70	15-30	2-15
	33-60	Stratified sand to silt loam.	CL, ML, SC, SM	A-4, A-2	0	0	90-100	80-100	50-95	10-60	<25	NP-10
125----------- Selma	0-16	Clay loam-----	CL	A-6	0	0	100	100	85-100	60-90	30-40	11-20
	16-46	Sandy loam, loam, silty clay loam.	CL, SC	A-6	0	0	100	95-100	80-95	38-85	24-36	11-19
	46-60	Stratified sand to silt loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0	0	90-100	85-100	60-90	30-70	15-35	5-20
131B---------- Alvin	0-7	Fine sandy loam.	SM, ML	A-4, A-2	0	0	100	100	80-95	30-60	<25	NP-4
	7-21	Very fine sandy loam, sandy loam, loamy fine sand.	SM, ML	A-2, A-4	0	0	100	100	80-95	30-60	<25	NP-4
	21-37	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	37-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4
132A---------- Starks	0-14	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-100	20-35	4-15
	14-21	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	80-100	35-45	15-25
	21-43	Loam, silty clay loam, sandy loam.	CL, SC, CL-ML, SC-SM	A-4, A-6	0	0	95-100	90-100	80-95	40-80	25-40	6-17
	43-60	Stratified loamy sand to silt loam.	SM, SC, ML, CL	A-2, A-4, A-6	0-1	0-5	90-100	80-95	40-90	30-60	<30	NP-15
134B---------- Camden	0-7	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	22-40	3-14
	7-30	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-45	15-25
	30-47	Silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	90-100	85-100	80-90	65-90	35-55	18-35
	47-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
141A----------Wesley	0-13	Fine sandy loam.	SM, SC-SM	A-2, A-4	0	0	100	95-100	70-90	30-50	<25	NP-5
	13-38	Fine sand, loamy very fine sand, fine sandy loam.	SM, SP-SM, SP	A-2, A-3	0	0-5	100	95-100	60-90	3-25	<30	NP-5
	38-60	Silty clay loam, loam, clay loam.	CL	A-6, A-7	0-1	0-5	100	95-100	85-100	60-95	30-45	13-26
142-----------Patton	0-14	Silty clay loam.	CL	A-6	0	0	100	100	95-100	80-95	30-40	15-25
	14-33	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	80-100	40-55	15-25
	33-60	Stratified silt loam to silty clay loam.	CL	A-6	0	0	100	100	95-100	75-95	25-40	10-20
145B----------Saybrook	0-13	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-15
	13-27	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	0	95-100	95-100	90-100	85-100	35-55	15-30
	27-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	0	95-100	85-100	80-95	60-85	20-40	8-25
146A----------Elliott	0-11	Silt loam-----	CL	A-6, A-4	0	0	95-100	95-100	95-100	75-100	30-40	8-18
	11-41	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	41-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	90-100	85-100	80-100	65-95	28-45	11-24
146B----------Elliott	0-12	Silt loam-----	CL	A-6, A-4	0	0	95-100	95-100	95-100	75-100	30-40	8-18
	12-42	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	42-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	90-100	85-100	80-100	70-95	28-45	11-24
146B2---------Elliott	0-10	Silty clay loam.	CL, ML	A-6, A-7	0	0	95-100	95-100	95-100	85-100	30-50	11-20
	10-26	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	26-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	90-100	85-100	80-100	70-95	28-45	11-24

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
146C2--------- Elliott	0-10	Silty clay loam.	CL, ML	A-6, A-7	0	0	95-100	95-100	95-100	85-100	30-50	11-20
	10-36	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	36-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	90-100	85-100	80-100	70-95	28-45	11-24
147A---------- Clarence	0-13	Silty clay loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	85-100	30-45	15-25
	13-28	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	28-60	Silty clay, clay.	CL, CH	A-7	0	0-5	95-100	95-100	90-100	85-100	45-65	25-40
147B2--------- Clarence	0-8	Silty clay loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	85-100	30-45	15-25
	8-35	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	35-60	Silty clay, clay.	CL, CH	A-7	0	0-5	95-100	95-100	90-100	85-100	45-65	25-40
147C2--------- Clarence	0-9	Silty clay loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	85-100	30-45	15-25
	9-28	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	28-60	Silty clay, clay.	CL, CH	A-7	0	0-5	95-100	95-100	90-100	85-100	45-65	25-40
148B---------- Proctor	0-15	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	15-40	Silty clay loam.	CL	A-7, A-6	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	40-45	Clay loam, sandy loam, loam.	CL, SC, CL-ML, SC-SM	A-6, A-7, A-4, A-2	0	0	90-100	85-100	75-100	30-80	20-45	5-25
	45-60	Stratified loam to sand.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-6	0	0	85-100	80-100	50-100	25-80	20-40	5-20
149A---------- Brenton	0-12	Silt loam-----	CL, ML	A-6, A-4	0	0	100	95-100	95-100	85-100	30-40	8-15
	12-28	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	95-100	95-100	85-100	35-50	10-25
	28-44	Clay loam, loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	90-100	75-95	30-45	10-20
	44-60	Stratified loamy sand to silty clay loam.	CL-ML, CL, SC-SM, SC	A-2, A-4, A-6	0	0	95-100	85-100	80-100	30-85	20-35	5-20
150B---------- Onarga	0-17	Fine sandy loam.	SC-SM, SM, CL-ML, ML	A-4	0	0	100	95-100	65-85	35-55	<20	NP-5
	17-31	Sandy loam, fine sandy loam.	SC-SM, SM, CL-ML, ML	A-2-4, A-4	0	0	100	95-100	60-85	25-55	15-25	NP-7
	31-60	Stratified sand to fine sandy loam.	SP-SM, SM, SC-SM	A-1-b, A-2-4, A-3	0	0	95-100	90-100	45-85	5-50	<15	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
150C---------- Onarga	0-10	Fine sandy loam.	SC, SM, SC-SM	A-4, A-6, A-2	0	0	100	100	75-95	25-50	<28	NP-12
	10-35	Loam, sandy clay loam, fine sandy loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-2-4, A-2-6	0	0	95-100	95-100	75-95	30-60	19-32	5-14
	35-60	Stratified sand to sandy loam.	SM, SP-SM, SC-SM	A-2, A-4	0	0	85-100	80-100	70-95	12-50	<20	NP-6
151A---------- Ridgeville	0-16	Fine sandy loam.	SM, SC-SM	A-2, A-4	0	0	100	100	90-100	15-50	<25	NP-6
	16-41	Very fine sandy loam, sandy clay loam, loam.	SC-SM, SC, CL, CL-ML	A-4, A-6	0	0	95-100	95-100	75-95	35-60	20-35	5-15
	41-60	Loamy sand, sandy loam, fine sand.	SM, SC-SM, SC, SP-SM	A-2, A-4	0	0	90-100	90-100	70-100	10-50	<20	NP-8
152----------- Drummer	0-15	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	15-42	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	42-60	Loam, silt loam, clay loam.	CL	A-6, A-7	0	0-5	95-100	90-100	75-95	60-85	30-50	15-30
153----------- Pella	0-14	Silty clay loam.	CL	A-7	0	0	100	95-100	90-100	85-95	40-50	15-25
	14-36	Silty clay loam, silty clay, clay loam.	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	15-30
	36-44	Stratified silty clay loam to sandy loam.	CL	A-6, A-7	0	0-5	95-100	90-100	85-95	60-90	25-45	10-25
	44-60	Stratified sandy loam to silty clay loam.	SC-SM, SC, CL, CL-ML	A-2, A-4, A-6	0	0-5	90-100	80-100	50-100	30-85	20-35	7-20
189A---------- Martinton	0-12	Silt loam-----	CL	A-6, A-7	0	0	95-100	95-100	90-100	75-95	30-45	10-20
	12-39	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	95-100	95-100	90-100	70-95	35-50	20-30
	39-60	Stratified sandy loam to silty clay.	CL, SC	A-6, A-7	0	0	90-100	80-100	75-100	35-90	25-45	10-25
189B---------- Martinton	0-10	Silt loam-----	CL	A-6, A-7	0	0	95-100	95-100	90-100	75-95	30-45	10-20
	10-34	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	95-100	95-100	90-100	70-95	35-50	20-30
	34-60	Stratified sandy loam to silty clay.	CL, SC	A-6, A-7	0	0	90-100	80-100	75-100	35-90	25-45	10-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
192A----------- Del Rey	0-17	Silt loam-----	CL	A-6, A-7	0	0	95-100	95-100	90-100	70-95	25-45	10-25
	17-47	Silty clay loam, silty clay.	CH, CL	A-7	0	0	95-100	95-100	90-100	85-95	40-55	20-30
	47-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	70-95	30-45	10-25
206----------- Thorp	0-11	Silt loam-----	CL	A-6, A-4	0	0	95-100	95-100	90-100	75-95	20-40	8-19
	11-15	Silt loam-----	CL	A-4, A-6	0	0	95-100	95-100	90-100	75-95	25-35	7-15
	15-41	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	95-100	95-100	90-100	75-95	35-50	13-27
	41-49	Silt loam, clay loam, sandy clay loam.	CL	A-6, A-4, A-7	0	0	90-100	90-100	90-100	70-90	20-50	8-26
	49-60	Sandy loam, sand.	SM, ML, CL-ML, SC-SM	A-2, A-4	0	0	85-100	75-95	65-85	20-60	<20	NP-6
223B2--------- Varna	0-7	Silty clay loam.	CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-95	30-50	12-25
	7-38	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-1	0-10	95-100	85-100	85-100	80-100	35-56	15-29
	38-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-10	95-100	85-100	85-100	80-95	30-45	13-26
223C2--------- Varna	0-13	Silty clay loam.	CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-95	30-50	12-25
	13-27	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-1	0-10	95-100	85-100	85-100	80-100	35-56	15-29
	27-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-10	95-100	85-100	85-100	80-95	30-45	13-26
228A---------- Nappanee	0-13	Silt loam-----	CL	A-6	0	0-5	95-100	90-100	85-100	55-90	30-40	10-15
	13-33	Silty clay, clay.	CH	A-7	0	0-5	95-100	90-100	85-100	70-95	50-70	25-45
	33-60	Silty clay, clay, clay loam.	CL, CH	A-7	0	0-5	95-100	90-100	85-100	70-95	40-60	20-35
228B---------- Nappanee	0-7	Silt loam-----	CL	A-6	0	0-5	95-100	90-100	85-100	55-90	30-40	10-15
	7-36	Silty clay, clay.	CH	A-7	0	0-5	95-100	90-100	85-100	70-95	50-70	25-45
	36-60	Silty clay, clay, clay loam.	CL, CH	A-7	0	0-5	95-100	90-100	85-100	70-95	40-60	20-35
228C---------- Nappanee	0-10	Silt loam-----	CL	A-6	0	0-5	95-100	90-100	85-100	55-90	30-40	10-15
	10-25	Silty clay, clay.	CH	A-7	0	0-5	95-100	90-100	85-100	70-95	50-70	25-45
	25-60	Silty clay, clay, clay loam.	CL, CH	A-7	0	0-5	95-100	90-100	85-100	70-95	40-60	20-35

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
229----------- Monee	0-9	Silt loam-----	CL	A-6, A-7	0	0	100	95-100	80-100	65-90	30-45	10-20
	9-16	Silty clay loam, silt loam, loam.	CL	A-6	0	0	100	95-100	80-100	65-95	30-40	10-20
	16-20	Silty clay loam, silt loam, clay loam.	CL, CH	A-6, A-7	0	0	100	95-100	80-100	65-95	35-55	15-30
	20-47	Silty clay, clay, silty clay loam.	CH	A-7	0	0-5	95-100	95-100	90-100	80-95	50-65	25-40
	47-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	0-5	95-100	90-100	90-100	80-95	45-65	20-40
230----------- Rowe	0-11	Silty clay----	CL, CH	A-7	0	0	100	95-100	90-100	85-95	45-60	25-35
	11-45	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	75-95	50-70	30-45
	45-60	Silty clay, clay.	CL, CH	A-7	0	0-5	95-100	90-100	90-100	75-95	45-60	20-35
232----------- Ashkum	0-20	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	75-100	40-55	20-30
	20-47	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	90-100	85-100	75-100	45-65	20-35
	47-60	Silty clay loam, silty clay.	CL	A-7, A-6	0	0-5	95-100	85-100	80-100	75-95	35-50	15-30
235----------- Bryce	0-11	Silty clay----	CH, CL	A-7	0	0	100	100	95-100	85-95	45-60	20-30
	11-48	Silty clay, clay.	CH	A-7	0-1	0-5	95-100	95-100	95-100	75-95	50-60	25-35
	48-60	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-1	0-5	95-100	90-100	90-100	75-95	40-65	20-40
238----------- Rantoul	0-17	Silty clay----	CH, CL	A-7	0	0	95-100	95-100	90-100	90-100	40-60	18-30
	17-40	Silty clay, clay.	CH, CL, MH, ML	A-7	0	0	95-100	90-100	90-100	85-100	45-70	20-35
	40-60	Silty clay loam, silty clay, clay.	CH, CL, MH, ML	A-6, A-7	0	0-5	95-100	90-100	90-100	85-100	35-75	18-40
241C---------- Chatsworth	0-8	Silty clay----	CH	A-7	0	0	100	100	95-100	90-100	50-65	25-35
	8-16	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	0	100	95-100	95-100	90-100	45-75	20-45
	16-60	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	0	100	95-100	90-100	85-95	45-65	20-35
241D---------- Chatsworth	0-2	Silty clay----	CH	A-7	0	0	100	100	95-100	90-100	50-65	25-35
	2-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	0	100	95-100	95-100	90-100	45-75	20-45
	18-60	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	0	100	95-100	90-100	85-95	45-65	20-35

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
293A---------- Andres	0-11	Loam----------	CL, ML	A-7, A-6, A-4	0	0	95-100	95-100	90-100	80-95	30-48	6-21
	11-36	Clay loam, silty clay loam, sandy clay loam.	CL, ML, MH	A-7, A-6	0	0-5	85-100	80-100	65-100	50-85	35-55	10-27
	36-50	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	0-5	90-100	85-95	80-95	70-95	24-50	7-28
	50-60	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	0-5	90-100	85-95	80-95	70-95	24-50	7-28
294B---------- Symerton	0-11	Silt loam-----	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
	11-40	Gravelly clay loam, gravelly loam, clay loam.	CL, SC	A-7, A-6	0-3	0-10	95-100	55-95	50-90	40-90	35-45	15-25
	40-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-5	95-100	90-100	85-95	80-95	25-45	15-25
294B2--------- Symerton	0-9	Loam----------	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
	9-35	Gravelly clay loam, gravelly loam, clay loam.	CL, SC	A-7, A-6	0-3	0-10	95-100	55-95	50-90	40-90	35-45	15-25
	35-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-5	95-100	90-100	85-95	80-95	25-45	15-25
294C2--------- Symerton	0-8	Silt loam-----	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
	8-31	Gravelly clay loam, gravelly loam, clay loam.	CL, SC	A-7, A-6	0-3	0-10	95-100	55-95	50-90	40-90	35-45	15-25
	31-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-5	95-100	90-100	85-95	80-95	25-45	15-25
295A---------- Mokena	0-10	Silt loam-----	CL	A-6, A-7	0	0	95-100	95-100	85-100	75-90	30-45	10-20
	10-35	Clay loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6	0	0	95-100	95-100	70-90	45-85	35-50	15-25
	35-60	Silty clay, clay.	CH, CL	A-7	0	0-5	95-100	90-100	85-100	75-95	40-55	20-31

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
300----------- Westland	0-17	Clay loam-----	CL	A-6	0	0	100	100	75-100	55-90	30-40	11-16
	17-37	Clay loam, loam, silty clay loam.	CL, SC	A-6, A-4	0	0	85-100	85-100	50-100	40-80	25-40	8-16
	37-49	Gravelly sandy clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6	0	0-3	70-95	70-95	50-70	40-70	<35	NP-15
	49-60	Gravelly coarse sand, gravelly loamy coarse sand.	SP, SP-SM, SM	A-1, A-2	0	0-5	60-80	55-75	25-40	5-15	---	NP-3
330----------- Peotone	0-29	Silty clay loam.	CH, CL	A-7	0	0	100	95-100	95-100	80-100	40-65	15-35
	29-52	Silty clay loam, silty clay.	CH, CL	A-7	0	0-5	100	95-100	90-100	85-100	40-70	15-40
	52-60	Silty clay loam, silt loam, silty clay.	CL, CH, ML, MH	A-7, A-6	0	0-5	95-100	95-100	90-100	75-98	30-60	15-30
375A---------- Rutland	0-15	Silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	15-37	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	0	100	100	95-100	95-100	35-55	15-35
	37-60	Silty clay, clay.	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	20-35
375B---------- Rutland	0-13	Silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	13-40	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	0	100	100	95-100	95-100	35-55	15-35
	40-60	Silty clay, clay.	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	20-35
398A---------- Wea	0-12	Loam----------	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	90-100	45-100	45-100	20-30	4-13
	12-40	Silty clay loam, clay loam, loam.	CL	A-6	0	0	90-100	85-100	75-100	50-90	30-40	11-20
	40-54	Gravelly loam, gravelly sandy loam, gravelly sandy clay loam.	CL, SC	A-6, A-2	0	0-5	70-85	50-80	30-75	15-60	30-40	11-20
	54-60	Stratified gravelly loamy sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-1	1-5	30-70	30-70	10-40	1-10	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
398B---------- Wea	0-14	Loam----------	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	90-100	45-100	45-100	20-30	4-13
	14-37	Silty clay loam, clay loam, loam.	CL	A-6	0	0	90-100	85-100	75-100	50-90	30-40	11-20
	37-44	Gravelly loam, gravelly sandy loam, gravelly sandy clay loam.	CL, SC	A-6, A-2	0	0-5	70-85	50-80	30-75	15-60	30-40	11-20
	44-60	Stratified gravelly loamy sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-1	1-5	30-70	30-70	10-40	1-10	---	NP
435----------- Streator	0-8	Silty clay loam.	CL	A-4, A-6	0	0	100	100	95-100	95-100	30-40	8-16
	8-42	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-35
	42-60	Silty clay, clay.	CH, CL	A-7	0-1	0-5	100	100	90-100	85-95	40-55	20-35
440A---------- Jasper	0-11	Loam----------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	11-16	Loam, fine sandy loam, loam.	CL	A-6	0	0	100	100	85-95	60-75	20-35	10-20
	16-30	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	30-55	Fine sandy loam, loam, sandy clay loam.	SC, SC-SM	A-4, A-2-4	0	0	100	85-100	60-70	30-40	20-30	5-10
	55-60	Stratified silt loam to sand.	SC, CL-ML, CL, SC-SM	A-4	0	0	100	85-100	75-90	35-85	<30	5-10
440B---------- Jasper	0-11	Loam----------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	11-34	Loam, fine sandy loam, loam.	CL	A-6	0	0	100	100	85-95	60-75	20-35	10-20
	34-39	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	39-48	Fine sandy loam, loam, sandy clay loam.	SC, SC-SM	A-4, A-2-4	0	0	100	85-100	60-70	30-40	20-30	5-10
	48-60	Stratified silt loam to sand.	SC, CL-ML, CL, SC-SM	A-4	0	0	100	85-100	75-90	35-85	<30	5-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
440C2---------- Jasper	0-6	Loam----------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	6-11	Loam, fine sandy loam, loam.	CL	A-6	0	0	100	100	85-95	60-75	20-35	10-20
	11-36	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	36-45	Fine sandy loam, loam, sandy clay loam.	SC, SC-SM	A-4, A-2-4	0	0	100	85-100	60-70	30-40	20-30	5-10
	45-60	Stratified silt loam to sand.	SC, CL-ML, CL, SC-SM	A-4	0	0	100	85-100	75-90	35-85	<30	5-10
443B---------- Barrington	0-11	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-95	30-40	8-18
	11-37	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	80-95	35-50	11-25
	37-60	Stratified fine sandy loam to silty clay loam.	CL, SC-SM, SC, CL-ML	A-4, A-6	0	0	95-100	80-100	75-100	36-90	15-30	5-15
448B2---------- Mona	0-9	Silt loam-----	CL	A-4, A-6, A-7	0	0	100	95-100	95-100	85-100	25-45	8-25
	9-31	Clay loam, silty clay loam, sandy clay loam.	CL	A-6, A-7	0	0-5	95-100	85-95	75-90	60-85	35-50	11-25
	31-60	Silty clay, clay.	CH, CL	A-7	0-1	0-10	95-100	85-95	80-95	75-90	40-60	15-32
448C2---------- Mona	0-7	Silt loam-----	CL	A-4, A-6, A-7	0	0	100	95-100	95-100	85-100	25-45	8-25
	7-33	Clay loam, silty clay loam, sandy clay loam.	CL	A-6, A-7	0	0-5	95-100	85-95	75-90	60-85	35-50	11-25
	33-60	Silty clay, clay.	CH, CL	A-7	0-1	0-10	95-100	85-95	80-95	75-90	40-60	15-32
484----------- Harco	0-16	Silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	2-13
	16-35	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	35-50	14-27
	35-60	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	20-35	2-13
503A---------- Rockton	0-11	Silt loam-----	ML, CL-ML, CL	A-4	0	0	90-100	90-100	85-95	50-75	25-35	5-10
	11-16	Loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	0	90-100	90-100	75-90	45-70	30-45	10-20
	16-35	Clay, clay loam, silty clay.	CH, CL	A-7	0	0-2	90-100	90-100	90-95	70-90	40-60	20-35
	35-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
536. Dumps												
539B----------- Wenona	0-17	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	30-40	8-15
	17-38	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	17-35
	38-60	Silty clay, clay.	CH, CL	A-7	0-1	0-5	100	100	90-100	85-95	40-60	17-35
539C2---------- Wenona	0-8	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	30-40	8-15
	8-31	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	17-35
	31-60	Silty clay, clay.	CH, CL	A-7	0-1	0-5	100	100	90-100	85-95	40-60	17-35
541B----------- Graymont	0-12	Silt loam-----	CL-ML, ML	A-6, A-4, A-7-6	0	0	100	100	95-100	90-100	28-47	6-17
	12-33	Silty clay loam, silty clay.	ML, MH	A-7, A-6, A-4	0	0	100	100	95-100	90-100	33-58	8-27
	33-60	Silty clay loam, silt loam.	CL, CH	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	25-53	9-27
542------------ Rooks	0-15	Silty clay loam.	ML	A-6	0	0	100	100	95-100	90-100	32-54	8-22
	15-30	Silty clay loam, silty clay.	ML	A-6, A-7	0	0	100	100	95-100	90-100	32-58	8-27
	30-45	Silt loam, silty clay loam, loam.	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	95-100	85-100	20-54	6-22
	45-60	Silty clay loam, silty clay.	CL, ML, MH	A-6, A-7, A-4	0	0-5	95-100	90-95	85-95	80-95	30-59	7-30
560E----------- St. Clair	0-5	Silty clay loam.	CL	A-6, A-7	0	0-5	95-100	85-100	80-100	70-95	35-50	15-25
	5-26	Clay, silty clay.	CH, MH	A-7	0	0-5	95-100	85-100	75-100	65-95	50-70	20-40
	26-60	Clay, silty clay, silty clay loam.	CH	A-7	0	0-5	95-100	85-100	70-100	60-95	50-60	25-35
560F----------- St. Clair	0-2	Silty clay loam.	CL	A-6, A-7	0	0-5	95-100	85-100	80-100	70-95	35-50	15-25
	2-16	Clay, silty clay.	CH, MH	A-7	0	0-5	95-100	85-100	75-100	65-95	50-70	20-40
	16-60	Clay, silty clay, silty clay loam.	CH	A-7	0	0-5	95-100	85-100	70-100	60-95	50-60	25-35

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
571A---------- Whitaker	0-15	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	60-90	15-35	2-15
	15-35	Clay loam, silty clay loam, sandy clay loam.	CL, CL-ML	A-6, A-4	0	0	100	95-100	90-100	70-80	20-35	5-15
	35-60	Stratified coarse sand to silt loam.	ML, SM, CL-ML, SC-SM	A-4	0	0	98-100	98-100	60-85	40-60	<25	NP-7
573B---------- Tuscola	0-6	Loam----------	ML, CL, CL-ML	A-4	0	0	100	100	85-100	60-90	20-30	3-10
	6-50	Silty clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	80-95	50-90	20-40	6-20
	50-60	Stratified fine sand to silt loam.	SM, ML	A-4	0	0	100	95-100	75-90	40-90	<25	NP-4
573C2--------- Tuscola	0-6	Loam----------	ML, CL, CL-ML	A-4	0	0	100	100	85-100	60-90	20-30	3-10
	6-43	Silty clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	80-95	50-90	20-40	6-20
	43-60	Stratified fine sand to silt loam.	SM, ML	A-4	0	0	100	95-100	75-90	40-90	<25	NP-4
594----------- Reddick	0-11	Clay loam-----	CL	A-6, A-7	0	0	95-100	85-95	85-95	75-90	30-50	10-25
	11-41	Clay loam, silty clay loam.	CL	A-6, A-7	0-1	0-5	95-100	80-90	80-90	65-90	30-50	10-25
	41-60	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-1	0-10	95-100	90-100	85-95	80-95	35-55	15-30
609----------- Crane	0-11	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	70-90	20-30	3-12
	11-31	Clay loam, loam.	CL	A-6	0	0	95-100	75-100	60-100	50-80	30-40	10-15
	31-51	Gravelly sandy clay loam, gravelly sandy loam.	SC, SC-SM, GC, GM-GC	A-6, A-4, A-2-4, A-2-6	0-1	0-5	60-80	55-75	40-70	15-45	20-35	5-15
	51-60	Very gravelly loamy coarse sand, gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-1	0-7	50-80	35-75	5-45	2-12	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
614A----------- Chenoa	0-12	Silty clay loam.	ML, CL	A-6, A-7, A-4	0	0	100	100	95-100	90-100	32-48	8-21
	12-32	Silty clay loam, silty clay.	ML, MH	A-6, A-7, A-4	0	0	100	100	95-100	90-100	33-58	8-27
	32-36	Silty clay loam, silt loam.	CL, CH	A-7, A-6, A-4	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
	36-60	Silty clay loam, silt loam.	CL, CH	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
614B----------- Chenoa	0-10	Silty clay loam.	ML, CL	A-6, A-7, A-4	0	0	100	100	95-100	90-100	32-48	8-21
	10-28	Silty clay loam, silty clay.	ML, MH	A-6, A-7, A-4	0	0	100	100	95-100	90-100	33-58	8-27
	28-47	Silty clay loam, silt loam.	CL, CH	A-7, A-6, A-4	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
	47-60	Silty clay loam, silt loam.	CL, CH	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
740------------ Darroch	0-10	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	55-90	15-30	3-15
	10-34	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-2	0	0	95-100	90-100	70-100	30-80	20-40	5-20
	34-60	Stratified sand to silt loam.	SC, ML, CL, SM	A-4	0	0	95-100	90-100	70-85	35-85	<25	NP-8
803B----------- Orthents	0-60	Variable------	---	---	---	---	---	---	---	---	---	---
864, 865. Pits												
871E----------- Lenzburg	0-10	Silt loam-----	CL	A-6, A-4	0-1	2-10	80-100	75-100	65-95	55-85	25-40	8-20
	10-31	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0-2	2-10	80-95	75-90	70-90	55-85	25-45	10-25
	31-38	Silty clay loam, silt loam, gravelly loam.	CL	A-6, A-7	0-2	5-15	75-95	70-90	65-85	60-85	25-45	10-25
	38-60	Silty clay, silty clay loam, gravelly clay loam.	CL, CH	A-6, A-7	0-5	5-25	70-95	60-90	55-90	50-90	30-55	15-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
3073---------- Ross	0-14	Loam----------	ML, CL-ML, CL	A-4, A-6	0	0	90-100	90-100	80-100	65-95	20-35	NP-12
	14-54	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	0	90-100	85-100	70-100	55-95	22-45	3-20
	54-60	Stratified gravelly sandy loam to silt loam.	CL, ML, SM, GM	A-6, A-4, A-2	0	0-5	65-100	45-100	30-100	25-80	<30	NP-12
3107---------- Sawmill	0-17	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	17-29	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	29-48	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	0	100	100	85-100	70-95	25-50	8-25
	48-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	0	100	100	75-100	65-95	20-50	8-30
3292---------- Wallkill	0-9	Silt loam-----	ML, SM, OL	A-5, A-7	0	0	95-100	90-100	70-100	40-90	40-50	5-15
	9-34	Silt loam, gravelly loam, mucky silt loam.	CL, CL-ML, SC-SM, SC	A-4	0	0	75-100	70-100	60-100	40-90	15-25	5-10
	34-43	Sapric material, coprogenous earth, hemic material.	PT, OL	A-8	0	0	---	---	---	---	---	---
	43-60	Sapric material, hemic material.	PT	A-8	0	0	---	---	---	---	---	---
3306---------- Allison	0-22	Silt loam-----	CL	A-6, A-7	0	0	100	100	95-100	80-100	30-50	10-25
	22-41	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	90-100	30-50	10-25
	41-60	Silty clay loam, silt loam, clay loam.	ML, CL, CH, MH	A-6, A-7	0	0	100	100	90-100	75-95	35-55	10-30
3405---------- Zook	0-37	Silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	95-100	45-65	20-35
	37-53	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
	53-60	Silty clay loam, silty clay, silt loam.	CH, CL, ML, MH	A-7, A-6	0	0	100	100	95-100	95-100	35-80	10-50

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
3451---------- Lawson	0-16	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	16-33	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	33-41	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	60-100	20-45	10-25
	41-60	Stratified silty clay loam to sandy loam.	CL-ML, CL, SC-SM, SC	A-4, A-6	0	0	100	100	60-100	35-85	20-35	5-20
3776---------- Comfrey	0-19	Loam----------	ML, OL, CL	A-6, A-4	0	0	100	100	85-100	55-90	30-40	5-15
	19-34	Clay loam, loam.	OL, OH, MH, ML	A-7	0	0	100	100	85-100	65-85	45-60	12-25
	34-60	Clay loam, loam.	CL	A-7, A-6	0	0	100	100	80-100	60-85	35-50	12-25
4103---------- Houghton	0-9	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	9-60	Muck----------	PT	A-8	0	0	---	---	---	---	---	---

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
23A-------------- Blount	0-13	22-27	1.35-1.55	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.43	3	6	2-3
	13-26	35-50	1.40-1.70	0.06-0.2	0.12-0.19	4.5-6.5	Moderate-----	0.43			
	26-32	27-38	1.50-1.70	0.06-0.2	0.12-0.19	6.1-7.8	Moderate-----	0.43			
	32-60	27-38	1.60-1.85	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
23B-------------- Blount	0-10	22-27	1.35-1.55	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.43	3	6	2-3
	10-28	35-50	1.40-1.70	0.06-0.2	0.12-0.19	4.5-6.5	Moderate-----	0.43			
	28-34	27-38	1.50-1.70	0.06-0.2	0.12-0.19	6.1-7.8	Moderate-----	0.43			
	34-60	27-38	1.60-1.85	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
25E-------------- Hennepin	0-5	20-30	1.20-1.40	0.6-2.0	0.18-0.24	6.1-7.8	Low----------	0.28	3	6	1-2
	5-19	18-30	1.30-1.60	0.2-0.6	0.14-0.22	6.1-8.4	Low----------	0.32			
	19-60	18-30	1.70-1.85	0.2-0.6	0.10-0.15	7.4-8.4	Low----------	0.32			
25F-------------- Hennepin	0-5	20-30	1.20-1.40	0.6-2.0	0.18-0.24	6.1-7.8	Low----------	0.28	3	6	1-2
	5-18	18-30	1.30-1.60	0.2-0.6	0.14-0.22	6.1-8.4	Low----------	0.32			
	18-60	18-30	1.70-1.85	0.2-0.6	0.10-0.15	7.4-8.4	Low----------	0.32			
59--------------- Lisbon	0-13	20-25	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	3-5
	13-37	25-35	1.15-1.35	0.6-2.0	0.18-0.22	6.1-7.8	Moderate-----	0.43			
	37-41	20-30	1.45-1.55	0.6-2.0	0.15-0.20	6.1-8.4	Low----------	0.43			
	41-60	18-27	1.50-1.60	0.2-0.6	0.07-0.11	7.4-8.4	Low----------	0.43			
60C2------------- La Rose	0-7	18-27	1.10-1.35	0.6-2.0	0.20-0.24	6.6-7.8	Moderate-----	0.32	5	6	2-4
	7-18	27-35	1.35-1.55	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.32			
	18-60	18-27	1.50-1.70	0.6-2.0	0.09-0.11	7.4-8.4	Moderate-----	0.32			
67--------------- Harpster	0-16	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
	16-35	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	35-44	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
	44-60	15-30	1.40-1.60	0.6-2.0	0.11-0.22	7.4-8.4	Low----------	0.28			
69--------------- Milford	0-21	35-40	1.30-1.50	0.6-2.0	0.20-0.23	5.6-7.3	High---------	0.28	5	4	5-6
	21-43	35-42	1.40-1.60	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	43-60	20-30	1.50-1.70	0.2-0.6	0.20-0.22	6.6-8.4	Moderate-----	0.43			
91A-------------- Swygert	0-14	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.37	3	7	3-5
	14-21	30-45	1.30-1.55	0.2-0.6	0.08-0.16	5.6-7.3	High---------	0.28			
	21-37	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High---------	0.28			
	37-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High---------	0.28			
91B-------------- Swygert	0-11	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.37	3	7	3-5
	11-20	30-45	1.30-1.55	0.2-0.6	0.08-0.16	5.6-7.3	High---------	0.28			
	20-40	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High---------	0.28			
	40-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High---------	0.28			
91B2------------- Swygert	0-12	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.37	3	7	2-4
	12-17	30-45	1.30-1.55	0.2-0.6	0.08-0.16	5.6-7.3	High---------	0.28			
	17-39	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High---------	0.28			
	39-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High---------	0.28			
102A------------- La Hogue	0-16	10-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.28	5	5	3-4
	16-26	18-35	1.50-1.70	0.6-2.0	0.12-0.20	5.1-7.3	Moderate-----	0.28			
	26-33	10-20	1.55-1.75	0.6-6.0	0.08-0.20	5.6-7.3	Low----------	0.20			
	33-60	5-20	1.60-1.80	2.0-6.0	0.05-0.22	5.6-7.8	Low----------	0.20			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
125--------------	0-16	27-30	1.35-1.55	0.6-2.0	0.17-0.23	6.1-7.8	Moderate-----	0.28	5	6	4-6
Selma	16-46	18-30	1.40-1.60	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
	46-60	7-18	1.60-1.90	2.0-6.0	0.07-0.19	6.6-8.4	Low----------	0.28			
131B-------------	0-7	10-15	1.45-1.65	2.0-6.0	0.14-0.17	4.5-7.3	Low----------	0.24	5	3	.5-1
Alvin	7-21	10-15	1.45-1.65	2.0-6.0	0.10-0.17	4.5-7.3	Low----------	0.24			
	21-37	15-18	1.40-1.65	2.0-6.0	0.14-0.18	4.5-7.3	Low----------	0.24			
	37-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low----------	0.24			
132A-------------	0-14	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Starks	14-21	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.37			
	21-43	18-30	1.45-1.65	0.6-2.0	0.16-0.19	5.1-7.8	Moderate-----	0.37			
	43-60	5-20	1.55-1.75	0.6-2.0	0.08-0.18	5.1-7.8	Low----------	0.32			
134B-------------	0-7	20-27	1.35-1.55	0.6-2.0	0.21-0.25	5.1-7.3	Low----------	0.37	5	6	1-2
Camden	7-30	22-35	1.35-1.55	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	30-47	18-30	1.45-1.65	0.6-2.0	0.15-0.25	5.6-7.3	Low----------	0.37			
	47-60	10-22	1.55-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Low----------	0.37			
141A-------------	0-13	8-15	1.25-1.45	2.0-6.0	0.15-0.18	5.6-7.3	Low----------	0.24	3	3	3-4
Wesley	13-38	3-15	1.70-2.00	2.0-20	0.06-0.14	5.6-7.3	Low----------	0.20			
	38-60	23-33	1.40-1.60	0.06-0.2	0.09-0.12	6.6-8.4	Moderate-----	0.37			
142--------------	0-14	27-35	1.15-1.35	0.6-2.0	0.21-0.23	6.6-7.3	Moderate-----	0.28	5	7	3-5
Patton	14-33	27-35	1.25-1.45	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
	33-60	22-35	1.30-1.50	0.2-0.6	0.18-0.22	7.4-8.4	Moderate-----	0.43			
145B-------------	0-13	20-26	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	3-4
Saybrook	13-27	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	27-60	24-35	1.50-1.70	0.6-2.0	0.15-0.21	5.6-8.4	Low----------	0.37			
146A-------------	0-11	24-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	4	6	4-5
Elliott	11-41	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28			
	41-60	24-40	1.60-1.75	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
146B-------------	0-12	24-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	4	6	4-5
Elliott	12-42	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28			
	42-60	27-40	1.60-1.75	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
146B2------------	0-10	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	4	7	3-4
Elliott	10-26	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28			
	26-60	27-40	1.60-1.75	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
146C2------------	0-10	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	4	7	3-4
Elliott	10-36	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28			
	36-60	27-40	1.60-1.75	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
147A-------------	0-13	27-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.37	3	7	3-5
Clarence	13-28	50-60	1.40-1.60	<0.06	0.07-0.09	5.6-8.4	Moderate-----	0.28			
	28-60	40-60	1.65-1.75	<0.06	0.05-0.07	7.4-8.4	Moderate-----	0.28			
147B2------------	0-8	27-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.37	3	7	3-5
Clarence	8-35	50-60	1.40-1.60	<0.06	0.07-0.09	5.6-8.4	Moderate-----	0.28			
	35-60	40-60	1.65-1.75	<0.06	0.05-0.07	7.4-8.4	Moderate-----	0.28			
147C2------------	0-9	27-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.37	3	7	3-5
Clarence	9-28	50-60	1.40-1.60	<0.06	0.07-0.09	5.6-8.4	Moderate-----	0.28			
	28-60	40-60	1.65-1.75	<0.06	0.05-0.07	7.4-8.4	Moderate-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi-bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
148B-------------	0-15	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low-----------	0.32	5	6	2-4
Proctor	15-40	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	40-45	22-35	1.30-1.55	0.6-2.0	0.13-0.16	5.6-7.3	Moderate-----	0.32			
	45-60	10-20	1.40-1.70	0.6-2.0	0.07-0.19	6.1-7.8	Low-----------	0.17			
149A-------------	0-12	20-27	1.25-1.45	0.6-2.0	0.22-0.26	5.6-7.8	Low-----------	0.28	5	6	3-5
Brenton	12-28	25-35	1.30-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.28			
	28-44	20-30	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.28			
	44-60	15-30	1.50-1.70	0.6-2.0	0.11-0.20	5.6-8.4	Low-----------	0.28			
150B-------------	0-17	5-15	1.30-1.40	0.6-2.0	0.16-0.18	5.6-7.3	Low-----------	0.20	5	3	2-4
Onarga	17-31	15-18	1.50-1.70	0.6-2.0	0.12-0.17	5.1-6.5	Low-----------	0.24			
	31-60	2-10	1.55-1.70	6.0-20	0.08-0.12	5.1-7.3	Low-----------	0.24			
150C-------------	0-10	8-15	1.15-1.45	0.6-2.0	0.13-0.22	5.6-7.8	Low-----------	0.20	4	3	2-4
Onarga	10-35	15-18	1.45-1.70	0.6-2.0	0.15-0.19	4.5-7.3	Low-----------	0.20			
	35-60	2-10	1.65-1.90	6.0-20	0.05-0.13	5.1-7.3	Low-----------	0.15			
151A-------------	0-16	10-15	1.15-1.45	0.6-2.0	0.15-0.18	5.6-6.5	Low-----------	0.20	5	3	2-4
Ridgeville	16-41	14-18	1.45-1.70	0.6-2.0	0.15-0.19	5.6-6.5	Low-----------	0.20			
	41-60	3-10	1.55-1.90	2.0-6.0	0.09-0.13	6.6-7.8	Low-----------	0.20			
152--------------	0-15	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate-----	0.28	5	7	5-7
Drummer	15-42	20-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	42-60	22-33	1.30-1.55	0.6-2.0	0.17-0.20	6.1-8.4	Moderate-----	0.28			
153--------------	0-14	27-35	1.10-1.30	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	5-6
Pella	14-36	27-35	1.20-1.45	0.6-2.0	0.21-0.24	6.6-7.8	Moderate-----	0.28			
	36-44	15-30	1.35-1.60	0.6-2.0	0.15-0.20	7.4-8.4	Moderate-----	0.28			
	44-60	15-30	1.40-1.70	0.6-2.0	0.10-0.22	7.4-8.4	Low-----------	0.28			
189A-------------	0-12	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.28	5	6	4-5
Martinton	12-39	35-45	1.25-1.45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.43			
	39-60	15-42	1.40-1.60	0.2-0.6	0.11-0.22	7.4-8.4	Moderate-----	0.32			
189B-------------	0-10	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.28	5	6	4-5
Martinton	10-34	35-45	1.25-1.45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.43			
	34-60	15-42	1.40-1.60	0.2-0.6	0.11-0.22	7.4-8.4	Moderate-----	0.32			
192A-------------	0-17	15-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	3	6	2-3
Del Rey	17-47	35-45	1.40-1.65	0.06-0.2	0.12-0.20	4.5-8.4	Moderate-----	0.43			
	47-60	25-35	1.50-1.70	0.06-0.2	0.09-0.11	7.9-8.4	Moderate-----	0.43			
206--------------	0-11	20-27	1.15-1.35	0.2-0.6	0.22-0.24	5.1-7.8	Low-----------	0.37	5	6	4-6
Thorp	11-15	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-7.3	Low-----------	0.37			
	15-41	22-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	41-49	20-30	1.40-1.60	0.06-0.2	0.15-0.22	5.6-7.8	Moderate-----	0.37			
	49-60	5-20	1.50-1.70	2.0-6.0	0.05-0.13	6.1-8.4	Low-----------	0.24			
223B2------------	0-7	27-35	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Moderate-----	0.32	4	7	2-3
Varna	7-38	35-48	1.30-1.60	0.2-0.6	0.09-0.19	5.6-7.3	Moderate-----	0.32			
	38-60	27-40	1.50-1.70	0.06-0.2	0.12-0.18	6.6-8.4	Low-----------	0.37			
223C2------------	0-13	27-35	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Moderate-----	0.32	4	7	2-3
Varna	13-27	35-48	1.30-1.60	0.2-0.6	0.09-0.19	5.6-7.3	Moderate-----	0.32			
	27-60	27-40	1.50-1.70	0.06-0.2	0.12-0.18	6.6-8.4	Low-----------	0.37			
228A-------------	0-13	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low-----------	0.37	3	6	1-3
Nappanee	13-33	45-60	1.40-1.65	<0.06	0.08-0.14	5.1-7.8	Moderate-----	0.37			
	33-60	35-50	1.50-1.75	<0.06	0.06-0.12	7.4-8.4	Moderate-----	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
228B-------------- Nappanee	0-7	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low-----------	0.37	3	6	1-3
	7-36	45-60	1.40-1.65	<0.06	0.08-0.14	5.1-7.8	Moderate-----	0.37			
	36-60	35-50	1.50-1.75	<0.06	0.06-0.12	7.4-8.4	Moderate-----	0.37			
228C-------------- Nappanee	0-10	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low-----------	0.37	3	6	1-3
	10-25	45-60	1.40-1.65	<0.06	0.08-0.14	5.1-7.8	Moderate-----	0.37			
	25-60	35-50	1.50-1.75	<0.06	0.06-0.12	7.4-8.4	Moderate-----	0.37			
229--------------- Monee	0-9	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	3	6	2-4
	9-16	20-30	1.40-1.60	0.2-0.6	0.17-0.22	5.1-6.5	Moderate-----	0.37			
	16-20	30-40	1.35-1.60	0.2-0.6	0.18-0.21	5.6-6.5	Moderate-----	0.37			
	20-47	45-60	1.45-1.65	<0.06	0.09-0.13	5.6-7.8	High----------	0.37			
	47-60	38-60	1.45-1.75	<0.06	0.08-0.16	6.6-8.4	High----------	0.37			
230--------------- Rowe	0-11	40-50	1.25-1.45	0.06-0.2	0.14-0.18	5.1-7.8	Moderate-----	0.28	5	4	3-5
	11-45	48-60	1.40-1.60	<0.06	0.09-0.13	6.1-8.4	High----------	0.28			
	45-60	40-50	1.40-1.70	<0.06	0.08-0.12	7.4-8.4	Moderate-----	0.20			
232--------------- Ashkum	0-20	35-40	1.15-1.35	0.2-0.6	0.15-0.20	5.6-7.8	High----------	0.28	5	4	3-7
	20-47	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High----------	0.28			
	47-60	30-40	1.30-1.60	0.06-0.2	0.18-0.20	6.1-8.4	Moderate-----	0.28			
235--------------- Bryce	0-11	40-48	1.30-1.50	0.2-0.6	0.12-0.16	5.6-7.8	High----------	0.28	5	4	5-7
	11-48	42-52	1.35-1.60	0.06-0.2	0.09-0.13	6.6-8.4	High----------	0.28			
	48-60	38-60	1.60-1.75	<0.06	0.03-0.05	7.4-8.4	High----------	0.28			
238--------------- Rantoul	0-17	40-45	1.35-1.55	0.2-0.6	0.12-0.23	6.1-7.3	High----------	0.28	3	4	5-7
	17-40	42-60	1.45-1.65	<0.06	0.09-0.13	6.1-8.4	High----------	0.28			
	40-60	35-45	1.50-1.70	<0.06	0.08-0.20	7.4-8.4	High----------	0.28			
241C-------------- Chatsworth	0-8	40-60	1.35-1.60	<0.06	0.09-0.18	5.6-8.4	Moderate-----	0.32	3	4	.5-1
	8-16	35-60	1.50-1.70	<0.06	0.05-0.07	6.1-8.4	Moderate-----	0.32			
	16-60	35-50	1.60-1.85	<0.06	0.04-0.06	7.4-8.4	Moderate-----	0.32			
241D-------------- Chatsworth	0-2	40-60	1.35-1.60	<0.06	0.09-0.18	5.6-8.4	Moderate-----	0.32	3	4	.5-1
	2-18	35-60	1.50-1.70	<0.06	0.05-0.07	6.1-8.4	Moderate-----	0.32			
	18-60	35-50	1.60-1.85	<0.06	0.04-0.06	7.4-8.4	Moderate-----	0.32			
293A-------------- Andres	0-11	21-27	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.3	Low-----------	0.28	5	6	3-5
	11-36	22-35	1.35-1.50	0.6-2.0	0.16-0.20	5.6-7.8	Moderate-----	0.28			
	36-50	27-35	1.45-1.55	0.2-0.6	0.18-0.20	6.1-8.4	Moderate-----	0.37			
	50-60	22-35	1.50-1.75	0.06-0.2	0.13-0.18	7.4-8.4	Moderate-----	0.37			
294B-------------- Symerton	0-11	20-27	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low-----------	0.32	5	6	3-4
	11-40	27-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.24			
	40-60	20-35	1.45-1.70	0.06-0.2	0.09-0.10	6.6-8.4	Moderate-----	0.43			
294B2------------- Symerton	0-9	20-27	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low-----------	0.32	5	6	3-4
	9-35	27-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.24			
	35-60	20-35	1.45-1.70	0.06-0.2	0.09-0.10	6.6-8.4	Moderate-----	0.43			
294C2------------- Symerton	0-8	20-27	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low-----------	0.32	5	6	3-4
	8-31	27-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.24			
	31-60	20-35	1.45-1.70	0.06-0.2	0.09-0.10	6.6-8.4	Moderate-----	0.43			
295A-------------- Mokena	0-10	20-27	1.15-1.35	0.6-2.0	0.20-0.24	6.1-8.4	Low-----------	0.28	4	6	4-5
	10-35	23-35	1.35-1.55	0.2-0.6	0.15-0.20	6.1-8.4	Moderate-----	0.28			
	35-60	40-45	1.40-1.70	<0.06	0.08-0.12	6.6-8.4	Moderate-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
300-------------- Westland	0-17	27-29	1.45-1.55	0.6-2.0	0.17-0.23	6.1-7.3	Moderate-----	0.28	5	6	2-6
	17-37	20-35	1.40-1.65	0.6-2.0	0.15-0.20	6.1-7.3	Moderate-----	0.28			
	37-49	5-30	1.55-1.70	0.6-2.0	0.04-0.13	6.6-7.8	Low----------	0.28			
	49-60	1-10	1.65-1.95	>20	0.01-0.04	7.4-8.4	Low----------	0.10			
330-------------- Peotone	0-29	33-40	1.20-1.40	0.2-0.6	0.21-0.23	5.6-7.8	High---------	0.28	5	4	5-7
	29-52	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28			
	52-60	25-42	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High---------	0.28			
375A------------- Rutland	0-15	27-30	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	7	4-5
	15-37	35-45	1.35-1.55	0.2-0.6	0.18-0.20	5.1-8.4	High---------	0.43			
	37-60	40-50	1.45-1.70	0.06-0.2	0.08-0.12	6.6-8.4	High---------	0.32			
375B------------- Rutland	0-13	27-30	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	7	4-5
	13-40	35-45	1.35-1.55	0.2-0.6	0.18-0.20	5.1-8.4	High---------	0.43			
	40-60	40-50	1.45-1.70	0.06-0.2	0.08-0.12	6.6-8.4	High---------	0.32			
398A------------- Wea	0-12	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	5	5	2-5
	12-40	20-32	1.40-1.60	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-----	0.32			
	40-54	18-30	1.50-1.70	0.6-2.0	0.06-0.10	5.6-7.3	Moderate-----	0.24			
	54-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
398B------------- Wea	0-14	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	5	5	2-5
	14-37	20-32	1.40-1.60	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-----	0.32			
	37-44	18-30	1.50-1.70	0.6-2.0	0.06-0.10	5.6-7.3	Moderate-----	0.24			
	44-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
435-------------- Streator	0-8	30-40	1.20-1.40	0.2-0.6	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	5-6
	8-42	35-45	1.35-1.55	0.2-0.6	0.13-0.18	6.1-7.8	High---------	0.28			
	42-60	40-55	1.45-1.70	0.06-0.2	0.05-0.08	7.4-8.4	High---------	0.28			
440A------------- Jasper	0-11	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.28	5	5	3-5
	11-16	18-25	1.35-1.50	0.6-2.0	0.17-0.19	5.1-6.5	Low----------	0.28			
	16-30	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-7.3	Low----------	0.28			
	30-55	12-20	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.8	Low----------	0.28			
	55-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.28			
440B------------- Jasper	0-11	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.28	5	5	3-5
	11-34	18-25	1.35-1.50	0.6-2.0	0.17-0.19	5.1-6.5	Low----------	0.28			
	34-39	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-7.3	Low----------	0.28			
	39-48	12-20	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.8	Low----------	0.28			
	48-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.28			
440C2------------ Jasper	0-6	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.28	5	5	2-4
	6-11	18-25	1.35-1.50	0.6-2.0	0.17-0.19	5.1-6.5	Low----------	0.28			
	11-36	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-7.3	Low----------	0.28			
	36-45	12-20	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.8	Low----------	0.28			
	45-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.28			
443B------------- Barrington	0-11	20-27	1.20-1.40	0.6-2.0	0.22-0.26	5.6-7.3	Low----------	0.32	5	6	3-5
	11-37	27-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	37-60	7-28	1.50-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low----------	0.43			
448B2------------ Mona	0-9	20-33	1.10-1.30	0.6-2.0	0.17-0.24	6.1-7.8	Low----------	0.37	4	6	2-5
	9-31	25-35	1.35-1.55	0.2-0.6	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	31-60	40-50	1.40-1.65	<0.06	0.05-0.08	7.4-8.4	Moderate-----	0.28			
448C2------------ Mona	0-7	20-33	1.10-1.30	0.6-2.0	0.17-0.24	6.1-7.8	Low----------	0.37	4	6	2-5
	7-33	25-35	1.35-1.55	0.2-0.6	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	33-60	40-50	1.40-1.65	<0.06	0.05-0.08	7.4-8.4	Moderate-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
484------------- Harco	0-16	20-30	1.20-1.35	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	3-5
	16-35	24-35	1.25-1.45	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.32			
	35-60	20-27	1.30-1.50	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.32			
503A------------ Rockton	0-11	18-27	1.30-1.40	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.28	4	6	2-6
	11-16	25-35	1.40-1.55	0.6-2.0	0.17-0.19	5.1-6.5	Moderate-----	0.28			
	16-35	35-60	1.35-1.45	0.6-2.0	0.10-0.14	5.6-7.3	High---------	0.28			
	35-60	---	---	2.0-20	---	---	-------------	----			
536. Dumps											
539B------------ Wenona	0-17	20-27	1.10-1.30	0.2-0.6	0.22-0.24	5.1-6.5	Moderate-----	0.32	5	6	3-4
	17-38	35-42	1.35-1.55	0.2-0.6	0.13-0.18	5.1-6.5	High---------	0.32			
	38-60	40-45	1.45-1.70	0.2-0.6	0.05-0.08	7.4-8.4	High---------	0.32			
539C2----------- Wenona	0-8	20-27	1.10-1.30	0.2-0.6	0.22-0.24	5.1-6.5	Moderate-----	0.32	5	6	3-4
	8-31	35-42	1.35-1.55	0.2-0.6	0.13-0.18	5.1-6.5	High---------	0.32			
	31-60	40-45	1.45-1.70	0.2-0.6	0.05-0.08	7.4-8.4	High---------	0.32			
541B------------ Graymont	0-12	22-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	4-5
	12-33	27-35	1.25-1.45	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	33-60	22-40	1.50-1.75	0.06-0.2	0.14-0.18	6.6-8.4	Moderate-----	0.28			
542------------- Rooks	0-15	27-35	1.15-1.35	0.6-2.0	0.21-0.23	6.1-7.3	Moderate-----	0.28	5	7	3-5
	15-30	27-45	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	30-45	12-35	1.30-1.50	0.6-2.0	0.17-0.20	7.4-8.4	Low----------	0.43			
	45-60	27-45	1.60-1.75	0.06-0.2	0.14-0.18	7.4-8.4	Moderate-----	0.28			
560E------------ St. Clair	0-5	27-40	1.50-1.60	0.2-0.6	0.17-0.23	5.6-7.3	Moderate-----	0.43	3	7	1-3
	5-26	35-55	1.35-1.70	<0.06	0.10-0.12	5.6-7.3	High---------	0.37			
	26-60	35-55	1.60-1.75	<0.06	0.09-0.11	7.4-8.4	High---------	0.37			
560F------------ St. Clair	0-2	27-40	1.50-1.60	0.2-0.6	0.17-0.23	5.6-7.3	Moderate-----	0.43	3	7	1-3
	2-16	35-55	1.35-1.70	<0.06	0.10-0.12	5.6-7.3	High---------	0.37			
	16-60	35-55	1.60-1.75	<0.06	0.09-0.11	7.4-8.4	High---------	0.37			
571A------------ Whitaker	0-15	8-19	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	15-35	18-33	1.40-1.60	0.6-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.37			
	35-60	3-18	1.50-1.70	0.6-2.0	0.19-0.21	6.1-8.4	Low----------	0.37			
573B------------ Tuscola	0-6	8-20	1.30-1.65	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.32	5	5	1-3
	6-50	18-35	1.30-1.70	0.6-2.0	0.15-0.20	5.6-7.3	Moderate-----	0.32			
	50-60	5-45	1.30-1.70	0.6-2.0	0.14-0.18	7.4-8.4	Low----------	0.32			
573C2----------- Tuscola	0-6	8-20	1.30-1.65	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.32	5	5	1-3
	6-43	18-35	1.30-1.70	0.6-2.0	0.15-0.20	5.6-7.3	Moderate-----	0.32			
	43-60	5-45	1.30-1.70	0.6-2.0	0.14-0.18	7.4-8.4	Low----------	0.32			
594------------- Reddick	0-11	27-35	1.20-1.40	0.6-2.0	0.17-0.23	6.6-7.8	Moderate-----	0.24	4	6	3-6
	11-41	25-35	1.35-1.60	0.6-2.0	0.15-0.20	6.6-7.8	Moderate-----	0.28			
	41-60	25-43	1.50-1.70	0.06-0.2	0.08-0.20	7.4-8.4	Moderate-----	0.32			
609------------- Crane	0-11	15-27	1.30-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	5	5	2-3
	11-31	25-35	1.40-1.65	0.6-2.0	0.15-0.19	5.6-7.3	Low----------	0.28			
	31-51	18-30	1.50-1.65	0.6-2.0	0.08-0.16	5.6-7.3	Low----------	0.28			
	51-60	1-10	1.60-1.70	>20	0.02-0.04	7.4-8.4	Low----------	0.10			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
614A------------- Chenoa	0-12	27-32	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	4-5
	12-32	27-45	1.25-1.45	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	32-36	25-40	1.50-1.75	0.06-0.2	0.12-0.20	6.1-7.8	Moderate-----	0.28			
	36-60	25-40	1.50-1.75	0.06-0.2	0.14-0.20	7.4-8.4	Moderate-----	0.28			
614B------------- Chenoa	0-10	27-32	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	4-5
	10-28	27-45	1.25-1.45	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	28-47	25-40	1.50-1.75	0.06-0.2	0.12-0.20	6.1-7.8	Moderate-----	0.28			
	47-60	25-40	1.50-1.75	0.06-0.2	0.14-0.20	7.4-8.4	Moderate-----	0.28			
740-------------- Darroch	0-10	10-27	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	5	5	2-4
	10-34	18-35	1.40-1.60	0.6-2.0	0.17-0.19	5.6-7.3	Moderate-----	0.28			
	34-60	5-15	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.28			
803B------------- Orthents	0-60	---	---	---	---	---	-------------	----	---	---	---
864, 865. Pits											
871E------------- Lenzburg	0-10	20-27	1.30-1.60	0.2-2.0	0.17-0.20	6.6-8.4	Moderate-----	0.37	5	4L	.5-4
	10-31	20-35	1.30-1.60	0.2-0.6	0.15-0.18	6.6-8.4	Moderate-----	0.37			
	31-38	20-35	1.40-1.70	0.2-0.6	0.11-0.17	7.4-8.4	Moderate-----	0.37			
	38-60	25-45	1.40-1.70	0.2-0.6	0.08-0.18	7.4-8.4	High---------	0.32			
3073------------- Ross	0-14	15-27	1.20-1.45	0.6-2.0	0.19-0.24	6.1-7.8	Low----------	0.32	5	5	3-5
	14-54	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low----------	0.32			
	54-60	5-25	1.35-1.60	2.0-6.0	0.05-0.18	6.1-8.4	Low----------	0.32			
3107------------- Sawmill	0-17	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	17-29	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	29-48	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	48-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
3292------------- Wallkill	0-9	10-27	1.15-1.40	0.6-2.0	0.16-0.21	5.1-7.8	Low----------	0.37	5	5	4-12
	9-34	15-27	1.15-1.45	0.6-2.0	0.15-0.20	5.1-7.8	Low----------	0.37			
	34-43	---	0.25-0.45	2.0-6.0	0.35-0.45	5.1-7.8	-------------	----			
	43-60	---	0.25-0.45	2.0-6.0	0.35-0.45	5.6-7.8	-------------	----			
3306------------- Allison	0-22	25-27	1.30-1.50	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	6	2-4
	22-41	25-35	1.30-1.50	0.6-2.0	0.18-0.21	6.1-7.8	Moderate-----	0.28			
	41-60	25-40	1.35-1.60	0.6-2.0	0.15-0.21	6.1-7.8	Moderate-----	0.28			
3405------------- Zook	0-37	35-40	1.30-1.35	0.2-0.6	0.21-0.23	5.6-7.3	High---------	0.37	5	7	5-7
	37-53	36-45	1.30-1.45	0.06-0.2	0.11-0.13	5.6-7.8	High---------	0.28			
	53-60	20-45	1.30-1.45	0.06-0.2	0.11-0.22	5.6-7.8	High---------	0.28			
3451------------- Lawson	0-16	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	5	3-7
	16-33	10-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.28			
	33-41	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
	41-60	18-30	1.50-1.70	0.6-2.0	0.11-0.15	6.1-7.8	Moderate-----	0.43			
3776------------- Comfrey	0-19	18-27	1.20-1.40	0.6-2.0	0.20-0.24	6.6-7.8	Low----------	0.28	5	6	6-10
	19-34	18-35	1.20-1.40	0.6-2.0	0.16-0.20	6.6-7.8	Moderate-----	0.28			
	34-60	18-35	1.30-1.50	0.6-2.0	0.15-0.19	6.6-8.4	Moderate-----	0.28			
4103------------- Houghton	0-9	---	0.08-0.30	0.2-6.0	0.35-0.45	6.6-7.3	-------------	----	5	8	>70
	9-60	---	0.13-0.23	0.2-6.0	0.35-0.45	6.6-7.3	-------------	----			

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
23A, 23B---------- Blount	C	None--------	---	---	1.0-3.0	Perched	Jan-May	>60	---	High-----	High-----	High.
25E, 25F---------- Hennepin	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
59---------------- Lisbon	B	None--------	---	---	1.0-3.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
60C2-------------- La Rose	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
67---------------- Harpster	B/D	None--------	---	---	+.5-2.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Low.
69---------------- Milford	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
91A, 91B, 91B2---- Swygert	C	None--------	---	---	1.0-3.0	Perched	Feb-May	>60	---	High-----	High-----	Low.
102A-------------- La Hogue	B	None--------	---	---	1.0-3.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
125--------------- Selma	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
131B-------------- Alvin	B	None--------	---	---	3.0-6.0	Apparent	Mar-Jun	>60	---	Moderate	Low------	High.
132A-------------- Starks	C	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
134B-------------- Camden	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	Low------	Moderate.
141A-------------- Wesley	B	None--------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	Low.
142--------------- Patton	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
145B-------------- Saybrook	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
146A, 146B, 146B2, 146C2------------ Elliott	C	None---------	---	---	1.0-3.0	Apparent	Mar-May	>60	---	High-----	High-----	Moderate.
147A, 147B2, 147C2------------ Clarence	D	None---------	---	---	1.0-3.0	Perched	Feb-May	>60	---	Moderate	High-----	Low.
148B-------------- Proctor	B	None---------	---	---	3.0-5.0	Apparent	Mar-Jun	>60	---	High-----	Moderate	Moderate.
149A-------------- Brenton	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
150B-------------- Onarga	B	None---------	---	---	2.5-6.0	Apparent	Mar-May	>60	---	Moderate	Moderate	Moderate.
150C-------------- Onarga	B	None---------	---	---	2.5-6.0	Apparent	Mar-May	>60	---	Moderate	Low------	High.
151A-------------- Ridgeville	B	None---------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	High-----	Moderate	Moderate.
152--------------- Drummer	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
153--------------- Pella	B/D	None---------	---	---	+.5-2.0	Apparent	Dec-Jun	>60	---	High-----	High-----	Low.
189A, 189B-------- Martinton	C	None---------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	High-----	High-----	Moderate.
192A-------------- Del Rey	C	None---------	---	---	1.0-3.0	Apparent	Jan-May	>60	---	High-----	High-----	Moderate.
206--------------- Thorp	C/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
223B2, 223C2------ Varna	C	None---------	---	---	3.0-6.0	Perched	Mar-May	>60	---	High-----	Moderate	Moderate.
228A, 228B, 228C-- Nappanee	D	None---------	---	---	1.0-2.0	Perched	Nov-May	>60	---	Moderate	High-----	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
229: Monee	D	None	---	---	+.5-1.0	Apparent	Feb-May	>60	---	Moderate	High	Moderate.
230: Rowe	D	None	---	---	+.5-1.0	Apparent	Mar-Jun	>60	---	Moderate	High	Low.
232: Ashkum	B/D	None	---	---	+1-2.0	Apparent	Apr-Jun	>60	---	High	High	Moderate.
235: Bryce	D	None	---	---	+1-1.0	Apparent	Feb-Jun	>60	---	High	High	Low.
238: Rantoul	D	None	---	---	+.5-1.0	Perched	Mar-Jun	>60	---	Moderate	High	Low.
241C, 241D: Chatsworth	D	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
293A: Andres	C	None	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High	High	Low.
294B, 294B2, 294C2: Symerton	B	None	---	---	3.5-6.0	Apparent	Mar-May	>60	---	Moderate	High	Moderate.
295A: Mokena	C	None	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High	High	Moderate.
300: Westland	B/D	None	---	---	+.5-1.0	Apparent	Dec-May	>60	---	High	High	Low.
330: Peotone	B/D	None	---	---	+.5-1.0	Apparent	Feb-Jul	>60	---	High	High	Moderate.
375A, 375B: Rutland	C	None	---	---	1.0-3.0	Apparent	Mar-May	>60	---	High	High	Moderate.
398A, 398B: Wea	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
435: Streator	B/D	None	---	---	0-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
440A, 440B, 440C2: Jasper	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
443B-------------- Barrington	B	None---------	---	---	3.0-6.0	Apparent	Apr-Jun	>60	---	High-----	Moderate	Moderate.
448B2, 448C2------ Mona	B	None---------	---	---	2.5-4.0	Perched	Mar-Jun	>60	---	Moderate	High-----	Moderate.
484--------------- Harco	B	None---------	---	---	1.0-3.0	Apparent	Feb-Apr	>60	---	High-----	High-----	Low.
503A-------------- Rockton	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	Low.
536. Dumps												
539B, 539C2------- Wenona	C	None---------	---	---	3.0-5.0	Perched	Mar-Jun	>60	---	Moderate	High-----	Moderate.
541B-------------- Graymont	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
542--------------- Rooks	B	None---------	---	---	1.0-3.0	Apparent	Mar-May	>60	---	High-----	High-----	Moderate.
560E, 560F-------- St. Clair	D	None---------	---	---	2.0-3.0	Perched	Mar-May	>60	---	Moderate	High-----	Moderate.
571A-------------- Whitaker	C	None---------	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High-----	High-----	Moderate.
573B, 573C2------- Tuscola	B	None---------	---	---	2.0-3.5	Apparent	Nov-Apr	>60	---	High-----	Moderate	Low.
594--------------- Reddick	B/D	None---------	---	---	+.5-1.0	Apparent	Nov-May	>60	---	High-----	High-----	Low.
609--------------- Crane	B	None---------	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High-----	High-----	Low.
614A, 614B-------- Chenoa	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
740--------------- Darroch	B	None---------	---	---	1.0-3.0	Apparent	Dec-May	>60	---	High-----	High-----	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
803B. Orthents	---	None	---	---	>6.0	---	---	>60	---	---	---	---
864, 865. Pits												
871E. Lenzburg	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
3073. Ross	B	Frequent	Brief	Nov-Jun	4.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low	Low.
3107. Sawmill	B/D	Frequent	Brief	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
3292. Wallkill	C/D	Frequent	Brief	Sep-Jun	+.5-1.0	Apparent	Sep-Jun	>60	---	High	Moderate	Moderate.
3306. Allison	B	Frequent	Brief	Jan-May	3.0-6.0	Apparent	Mar-Jun	>60	---	High	High	Low.
3405. Zook	C/D	Frequent	Brief	Feb-Nov	0-3.0	Apparent	Nov-May	>60	---	High	High	Moderate.
3451. Lawson	C	Frequent	Brief	Mar-Nov	1.0-3.0	Apparent	Nov-May	>60	---	High	Moderate	Low.
3776. Comfrey	B/D	Frequent	Brief	Feb-Jul	0-3.0	Apparent	Apr-Jul	>60	---	High	High	Low.
4103. Houghton	D	None	---	---	+2-0.5	Apparent	Sep-Jun	>60	---	High	High	Low.

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Allison	Fine-silty, mixed, mesic Cumulic Hapludolls
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
Andres	Fine-loamy, mixed, mesic Aquic Argiudolls
Ashkum	Fine, mixed, mesic Typic Haplaquolls
Barrington	Fine-silty, mixed, mesic Typic Argiudolls
Blount	Fine, illitic, mesic Aeric Ochraqualfs
Brenton	Fine-silty, mixed, mesic Aquic Argiudolls
Bryce	Fine, mixed, mesic Typic Haplaquolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Chatsworth	Fine, illitic, mesic Typic Eutrochrepts
Chenoa	Fine, illitic, mesic Aquic Argiudolls
Clarence	Fine, illitic, mesic Aquic Argiudolls
Comfrey	Fine-loamy, mixed, mesic Cumulic Haplaquolls
Crane	Fine-loamy, mixed, mesic Aquic Argiudolls
Darroch	Fine-loamy, mixed, mesic Aquic Argiudolls
Del Rey	Fine, illitic, mesic Aeric Ochraqualfs
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Elliott	Fine, illitic, mesic Aquic Argiudolls
Graymont	Fine-silty, mixed, mesic Typic Argiudolls
Harco	Fine-silty, mixed, mesic Aquic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
*Hennepin	Fine-loamy, mixed, mesic Typic Eutrochrepts
Houghton	Euic, mesic Typic Medisaprists
Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
La Hogue	Fine-loamy, mixed, mesic Aquic Argiudolls
*La Rose	Fine-loamy, mixed, mesic Typic Argiudolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Lenzburg	Fine-loamy, mixed (calcareous), mesic Typic Udorthents
Lisbon	Fine-silty, mixed, mesic Aquic Argiudolls
Martinton	Fine, illitic, mesic Aquic Argiudolls
Milford	Fine, mixed, mesic Typic Haplaquolls
Mokena	Fine-loamy, mixed, mesic Aquic Argiudolls
*Mona	Fine-loamy, mixed, mesic Typic Argiudolls
Monee	Fine, illitic, mesic Mollic Ochraqualfs
Nappanee	Fine, illitic, mesic Aeric Ochraqualfs
Onarga	Coarse-loamy, mixed, mesic Typic Argiudolls
Orthents	Orthents
Patton	Fine-silty, mixed, mesic Typic Haplaquolls
Pella	Fine-silty, mixed, mesic Typic Haplaquolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Rantoul	Fine, montmorillonitic, mesic Vertic Haplaquolls
Reddick	Fine-loamy, mixed, mesic Typic Haplaquolls
Ridgeville	Coarse-loamy, mixed, mesic Aquic Argiudolls
Rockton	Fine-loamy, mixed, mesic Typic Argiudolls
Rooks	Fine-silty, mixed, mesic Aquic Argiudolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rowe	Fine, mixed, mesic Typic Argiaquolls
Rutland	Fine, montmorillonitic, mesic Aquic Argiudolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Saybrook	Fine-silty, mixed, mesic Typic Argiudolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
Starks	Fine-silty, mixed, mesic Aeric Ochraqualfs
St. Clair	Fine, illitic, mesic Typic Hapludalfs
Streator	Fine, montmorillonitic, mesic Typic Haplaquolls
Swygert	Fine, mixed, mesic Aquic Argiudolls
Symerton	Fine-loamy, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls
Tuscola	Fine-loamy, mixed, mesic Aquic Hapludalfs

TABLE 18.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
*Varna	Fine, illitic, mesic Typic Argiudolls
*Wallkill	Fine-loamy, mixed, nonacid, mesic Thapto-Histic Fluvaquents
Wea	Fine-loamy, mixed, mesic Typic Argiudolls
Wenona	Fine, montmorillonitic, mesic Typic Argiudolls
Wesley	Coarse-loamy, mixed, mesic Aquic Hapludolls
Westland	Fine-loamy, mixed, mesic Typic Argiaquolls
Whitaker	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Zook	Fine, montmorillonitic, mesic Cumulic Haplaquolls

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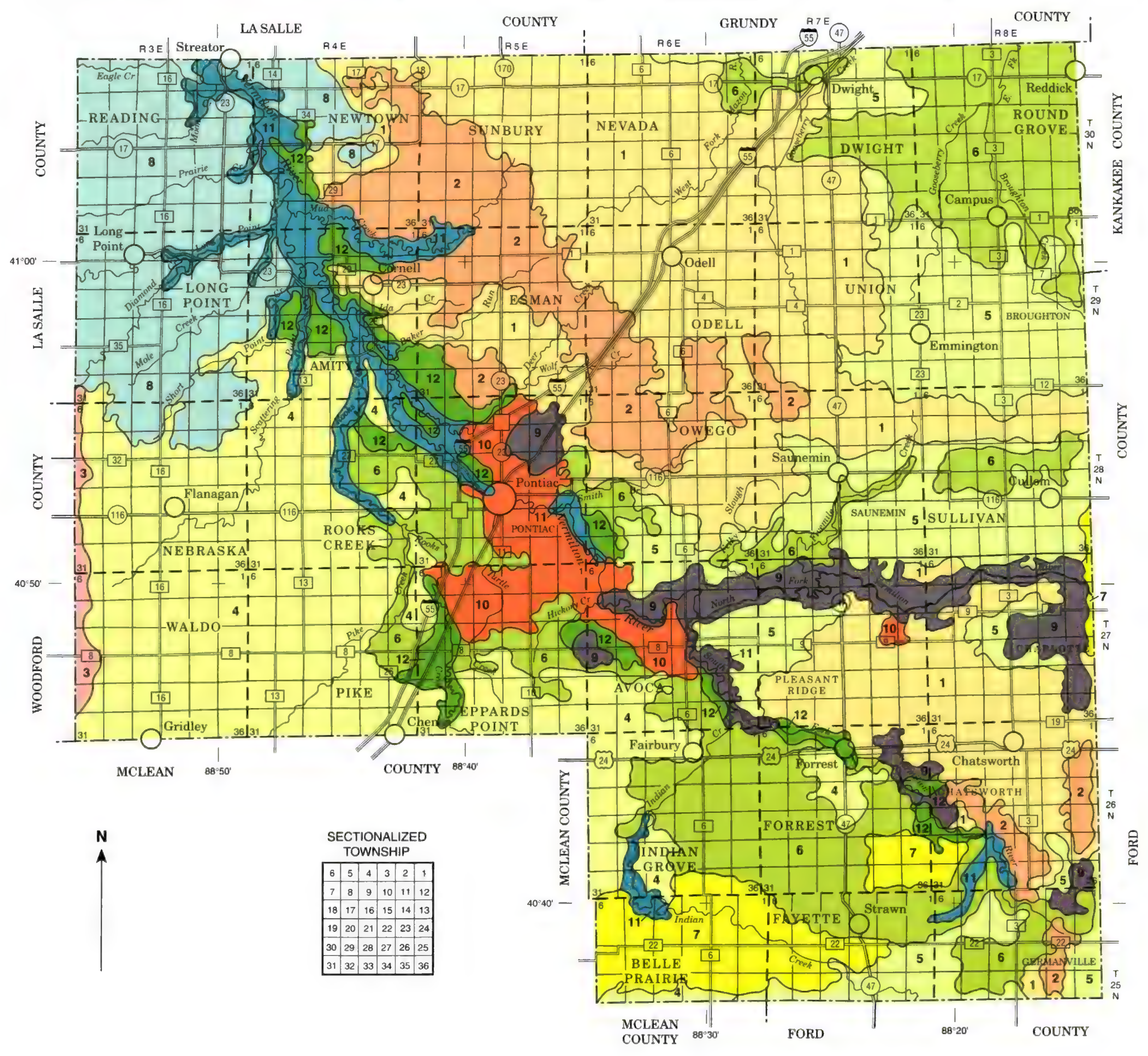


N

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more that one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND*

NEARLY LEVEL TO SLOPING SOILS THAT ARE SLOWLY PERMEABLE IN THE UPPER PART AND VERY SLOWLY PERMEABLE IN THE LOWER PART, ARE VERY SLOWLY PERMEABLE , OR ARE MODERATELY SLOWLY PERMEABLE IN THE UPPER PART AND SLOWLY PERMEABLE IN THE LOWER PART; ON TILL PLAINS

1 Bryce-Swygert association

2 Clarence-Rowe association

3 Rutland-Streator association

VERY LEVEL TO SLOPING SOILS THAT ARE MODERATELY PERMEABLE OR MODERATELY SLOWLY PERMEABLE IN THE UPPER PART AND SLOWLY PERMEABLE IN THE LOWER PART; ON TILL PLAINS

4 Ashkum-Chenoa association

5 Elliott-Ashkum association

6 Reddick-Andres-Symerton association

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT ARE MODERATELY PERMEABLE OR ARE MODERATEY PERMEABLE IN THE UPPER PART AND MODERATELY SLOWLY PERMEABLE IN THE LOWER PART; ON OUTWASH PLAINS AND TILL PLAINS

7 Drummer-Lisbon-Saybrook association

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT ARE MODERATELY PERMEABLE, ARE MODERATELY PERMEABLE IN THE UPPER PART AND MODERATELY SLOWLY PERMEABLE IN THE LOWER PART, OR ARE MODERATELY SLOWLY PERMEABLE; ON LAKE PLAINS

8 Patton-Harco association

9 Milford-Martinton association

NEARLY LEVEL TO SLOPING SOILS THAT HAVE A MODERATELY PERMEABLE SUBSOIL AND MODERATELY PERMEABLE, MODERATELY RAPIDLY PERMEABLE, OR VERY RAPIDLY PERMEABLE UNDERLYING MATERIAL; ON STREAM TERRACES AND OUTWASH PLAINS

10 Westland-Crane-Wea association

11 Whitaker-Tuscola-Starks association

12 Selma-La Hogue-Jasper association

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1992

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

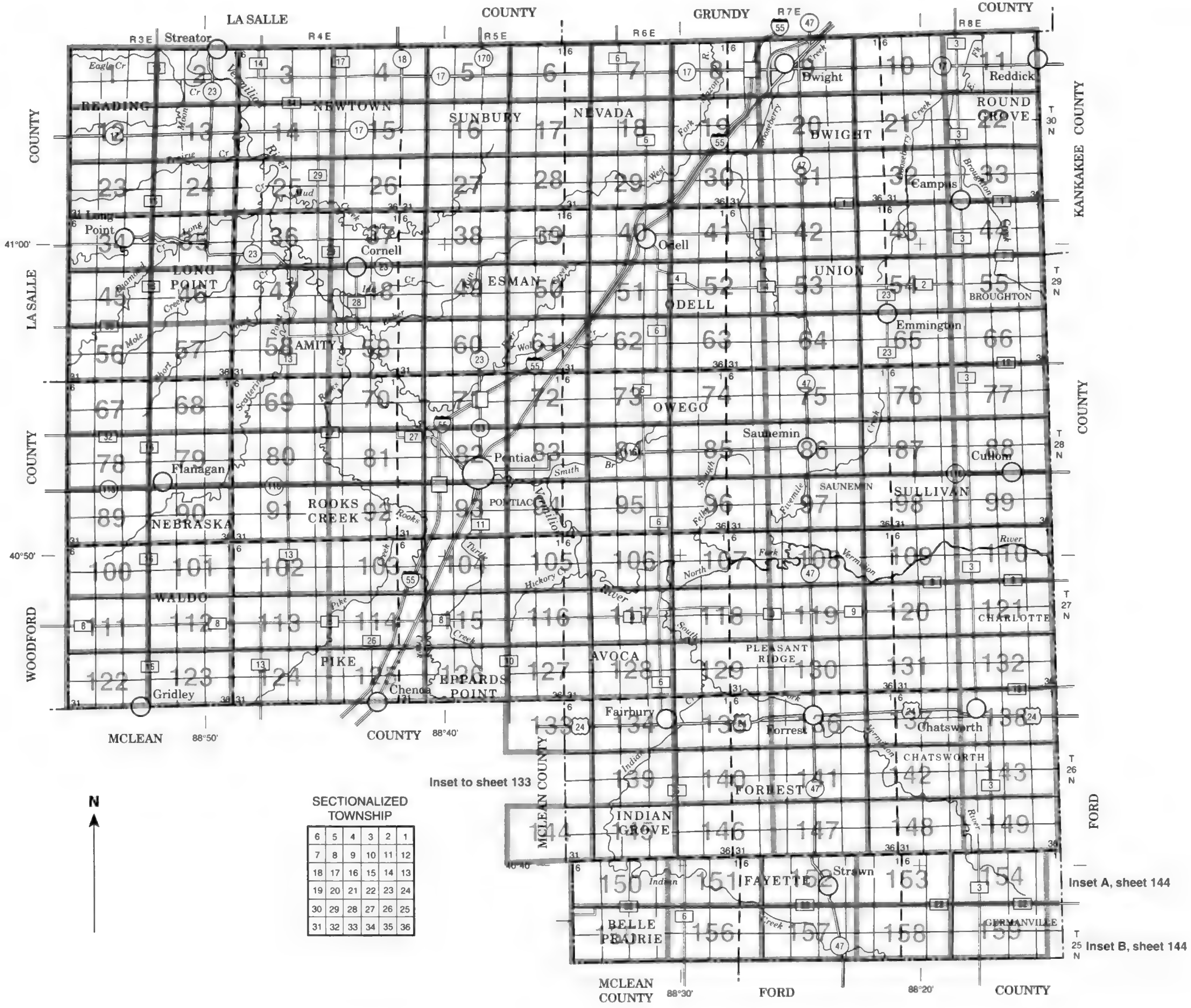
GENERAL SOIL MAP

LIVINGSTON COUNTY, ILLINOIS

Scale 1 : 253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km



INDEX TO MAP SHEETS

LIVINGSTON COUNTY, ILLINOIS

Scale 1 : 253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Map symbols consist of numbers, or a combination of numbers and letters. The initial numbers represent the kind of soil. A capital letter following those numbers indicates the class of slopes. Symbols without a slope letter are for nearly level soils or miscellaneous areas. Symbols with the slope letter A indicates nearly level soils that are also sloping within a major land resource area. A final number of 2 following the slope letter indicates that the soil is moderately eroded.

SYMBOL	NAME
23A	Blount silt loam, 0 to 2 percent slopes
23B	Blount silt loam, 2 to 4 percent slopes
25E	Hennepin silt loam, 12 to 20 percent slopes
25F	Hennepin silt loam, 20 to 35 percent slopes
59	Lisbon silt loam
60C2	La Rose loam, 5 to 10 percent slopes, eroded
67	Harpster silty clay loam
69	Milford silty clay loam
91A	Swygert silty clay loam, 0 to 2 percent slopes
91B	Swygert silty clay loam, 2 to 4 percent slopes
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded
102A	La Hogue loam, 0 to 2 percent slopes
125	Selma clay loam
131B	Alvin fine sandy loam, 1 to 5 percent slopes
132A	Starks silt loam, 0 to 2 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
141A	Wesley fine sandy loam, 0 to 2 percent slopes
142	Patton silty clay loam
145B	Saybrook silt loam, 2 to 5 percent slopes
146A	Elliott silt loam, 0 to 2 percent slopes
146B	Elliott silt loam, 2 to 4 percent slopes
146B2	Elliott silty clay loam, 2 to 4 percent slopes, eroded
146C2	Elliott silty clay loam, 4 to 7 percent slopes, eroded
147A	Clarence silty clay loam, 0 to 2 percent slopes
147B2	Clarence silty clay loam, 2 to 4 percent slopes, eroded
147C2	Clarence silty clay loam, 4 to 7 percent slopes, eroded
148B	Proctor silt loam, 2 to 5 percent slopes
149A	Brenton silt loam, 0 to 2 percent slopes
150B	Onarga fine sandy loam, 1 to 5 percent slopes
150C	Onarga fine sandy loam, 5 to 10 percent slopes
151A	Ridgeville fine sandy loam, 0 to 2 percent slopes
152	Drummer silty clay loam
153	Pella silty clay loam
189A	Martinton silt loam, 0 to 2 percent slopes
189B	Martinton silt loam, 2 to 5 percent slopes
192A	Del Rey silt loam, 0 to 2 percent slopes
206	Thorp silt loam
223B2	Varna silty clay loam, 2 to 4 percent slopes, eroded
223C2	Varna silty clay loam, 4 to 9 percent slopes, eroded
228A	Nappanee silt loam, 0 to 2 percent slopes
228B	Nappanee silt loam, 2 to 4 percent slopes
228C	Nappanee silt loam, 4 to 9 percent slopes
229	Monee silt loam
230	Rowe silty clay
232	Ashkum silty clay loam
235	Bryce silty clay
238	Rantoul silty clay
241C	Chatsworth silty clay, 4 to 10 percent slopes

SYMBOL	NAME
241D	Chatsworth silty clay, 10 to 20 percent slopes
293A	Andres loam, 0 to 2 percent slopes
294B	Symerton silt loam, 2 to 4 percent slopes
294B2	Symerton loam, 2 to 4 percent slopes, eroded
294C2	Symerton silt loam, 4 to 9 percent slopes, eroded
295A	Mokena silt loam, 0 to 2 percent slopes
300	Westland clay loam
330	Peotone silty clay loam
375A	Rutland silty clay loam, 0 to 2 percent slopes
375B	Rutland silty clay loam, 2 to 5 percent slopes
398A	Wea loam, 0 to 2 percent slopes
398B	Wea loam, 2 to 5 percent slopes
435	Streator silty clay loam
440A	Jasper loam, 0 to 2 percent slopes
440B	Jasper loam, 2 to 5 percent slopes
440C2	Jasper loam, 5 to 10 percent slopes, eroded
443B	Barrington silt loam, 2 to 5 percent slopes
448B2	Mona silt loam, 2 to 5 percent slopes, eroded
448C2	Mona silt loam, 5 to 10 percent slopes, eroded
484	Harco silty clay loam
503A	Rockton silt loam, 0 to 2 percent slopes
536	Dumps, mine
539B	Wenona silt loam, loamy substratum, 2 to 5 percent slopes
539C2	Wenona silt loam, loamy substratum, 5 to 10 percent slopes, eroded
541B	Graymont silt loam, 2 to 5 percent slopes
542	Rooks silty clay loam
560E	St. Clair silty clay loam, 12 to 20 percent slopes
560F	St. Clair silty clay loam, 20 to 35 percent slopes
571A	Whitaker loam, 0 to 2 percent slopes
573B	Tuscola loam, 2 to 5 percent slopes
573C2	Tuscola loam, 5 to 10 percent slopes, eroded
594	Reddick clay loam
609	Crane loam
614A	Chenoa silty clay loam, 0 to 2 percent slopes
614B	Chenoa silty clay loam, 2 to 5 percent slopes
740	Darroch silt loam
803B	Orthents, 1 to 7 percent slopes
864	Pits, quarries
865	Pits, gravel
871E	Lenzburg silt loam, 12 to 30 percent slopes
3073	Ross loam, frequently flooded
3107	Sawmill silty clay loam, frequently flooded
3292	Wallkill silt loam, frequently flooded
3306	Allison silt loam, frequently flooded
3405	Zook silty clay loam, frequently flooded
3451	Lawson silt loam, frequently flooded
3776	Comfrey loam, frequently flooded
4103	Houghton muck, ponded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County
- Reservation (national forest or park, state forest or park, and large airport)

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROAD EMBLEM & DESIGNATIONS

- Interstate — 55
- Federal — 24
- State — 116

DAMS

- Medium or Small — water

PITS

- Gravel pit
- Mine or quarry

WATER FEATURES

DRAINAGE

- Perennial, single line
- Intermittent
- Drainage end
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 147A 230

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

DEPRESSION OR SINK

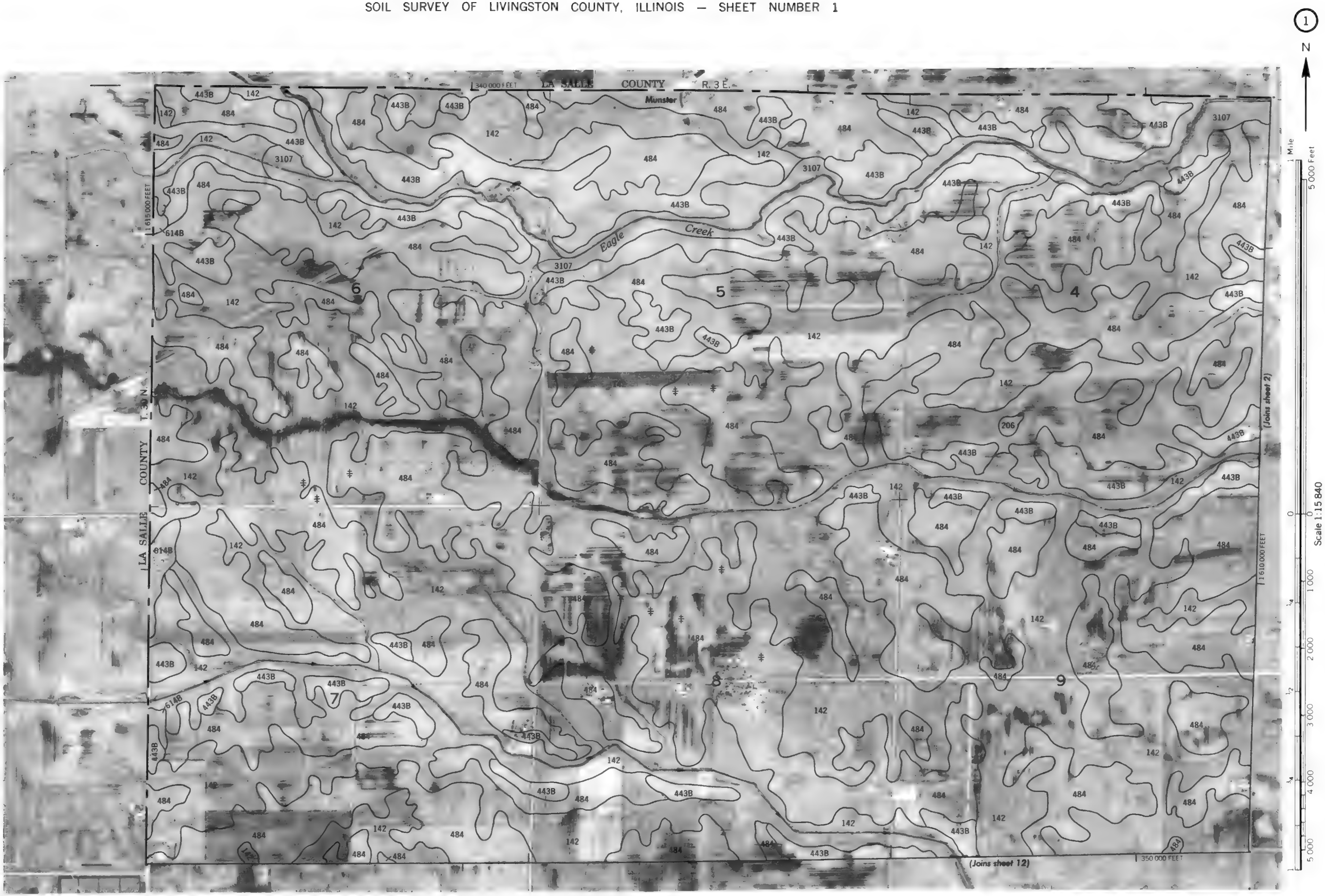
SOIL SAMPLE SITE

MISCELLANEOUS

- Gravelly spot
- Dumps and other similar non soil areas
- Rock outcrop (includes sandstone and shale)
- Sandy spot
- Severely eroded spot
- Muck spot
- Calcareous soil spot
- Gray spot

LIVINGSTON COUNTY, ILLINOIS NO. 1

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



2

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LIVINGSTON COUNTY, ILLINOIS NO. 2

LIVINGSTON COUNTY, ILLINOIS NO. 3

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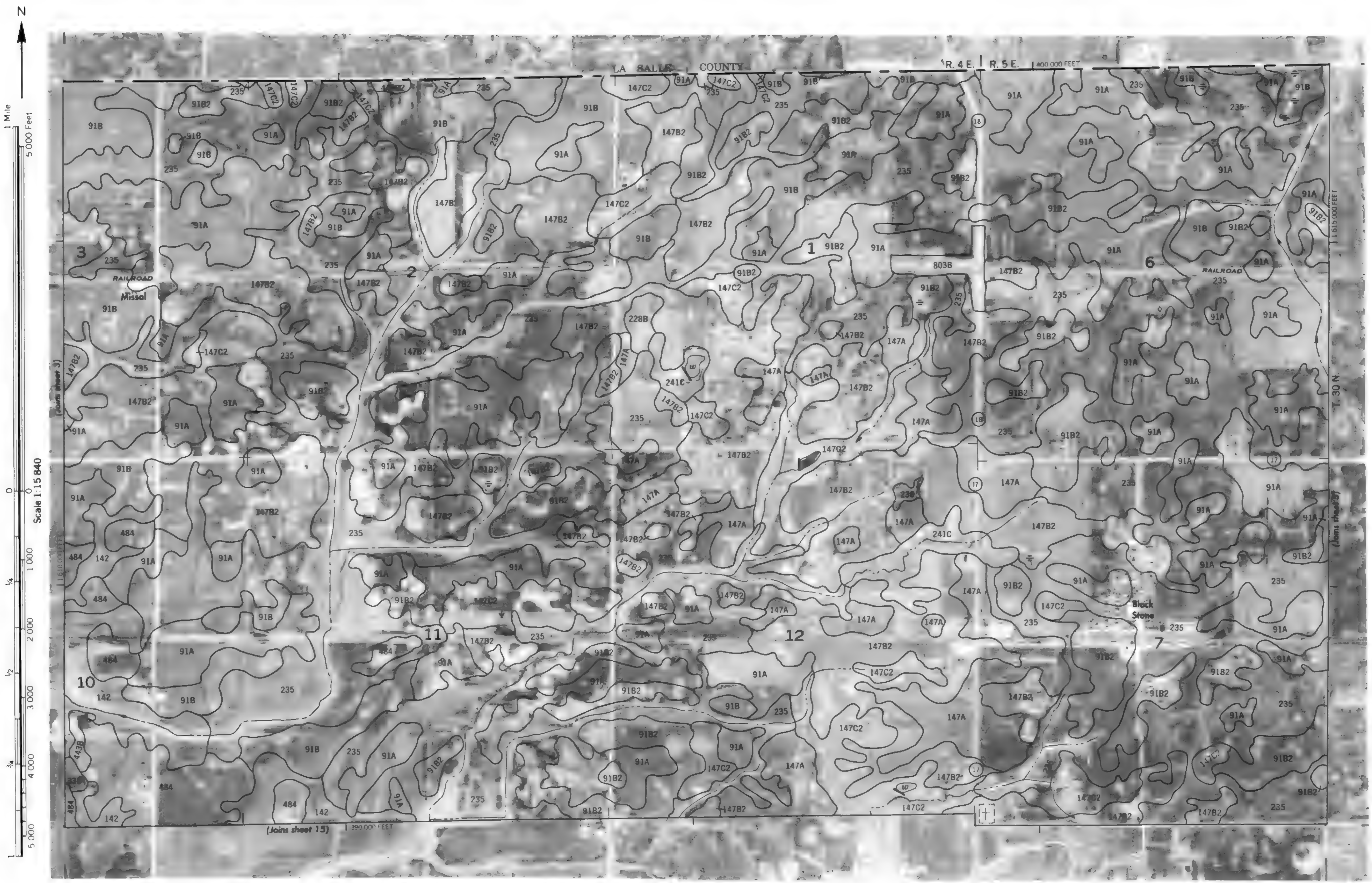
4



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LIVINGSTON COUNTY, ILLINOIS NO. 5

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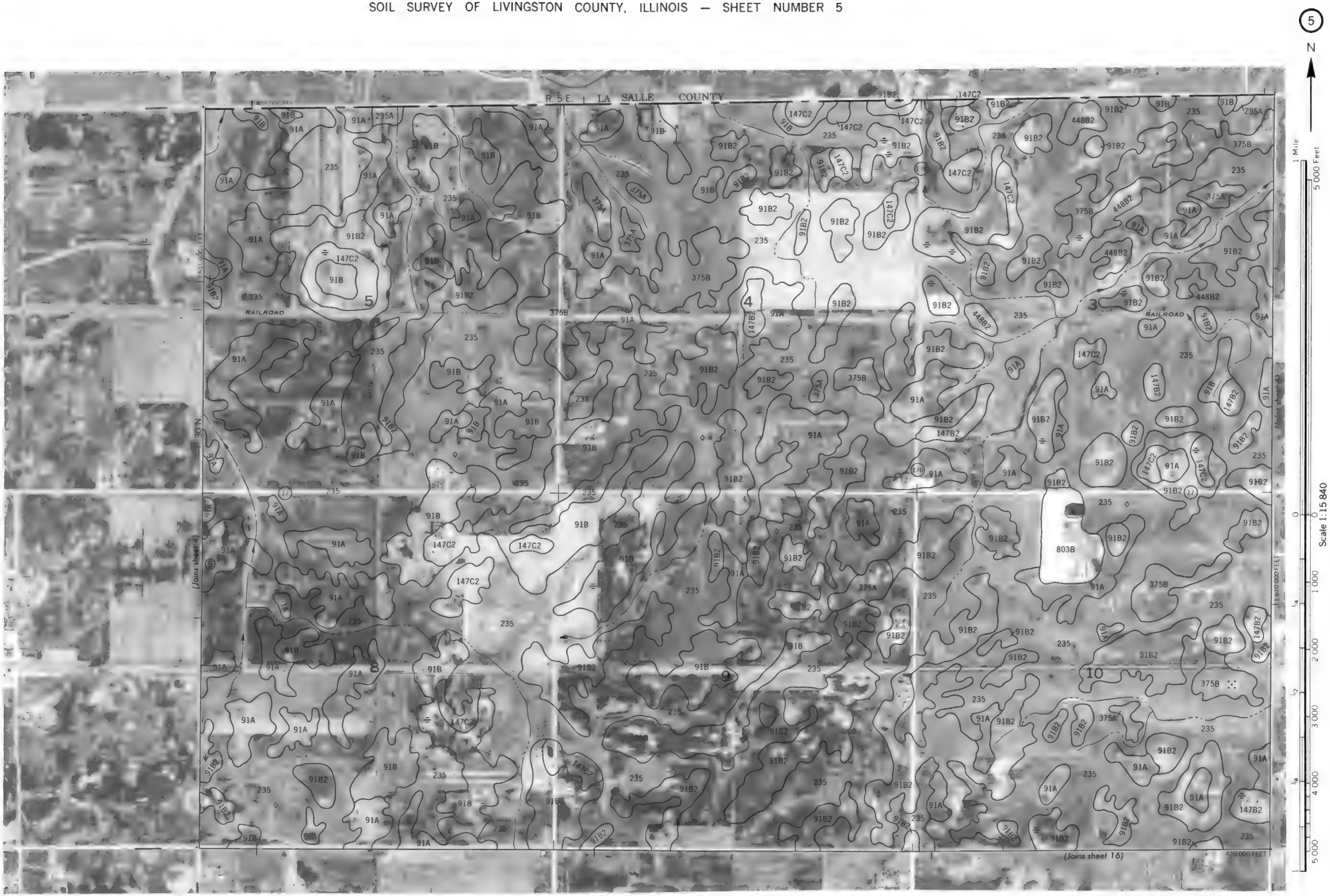


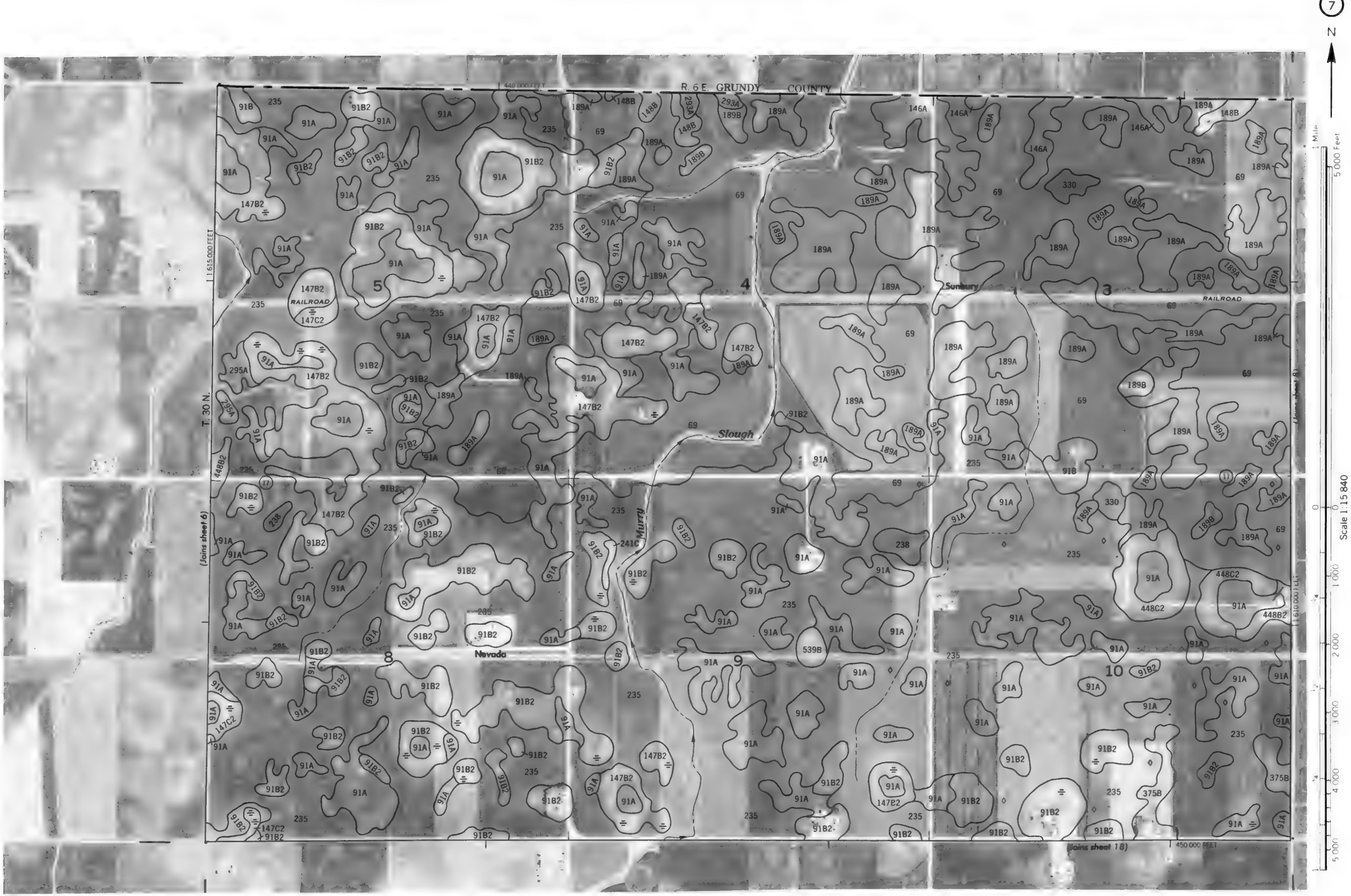
SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 6

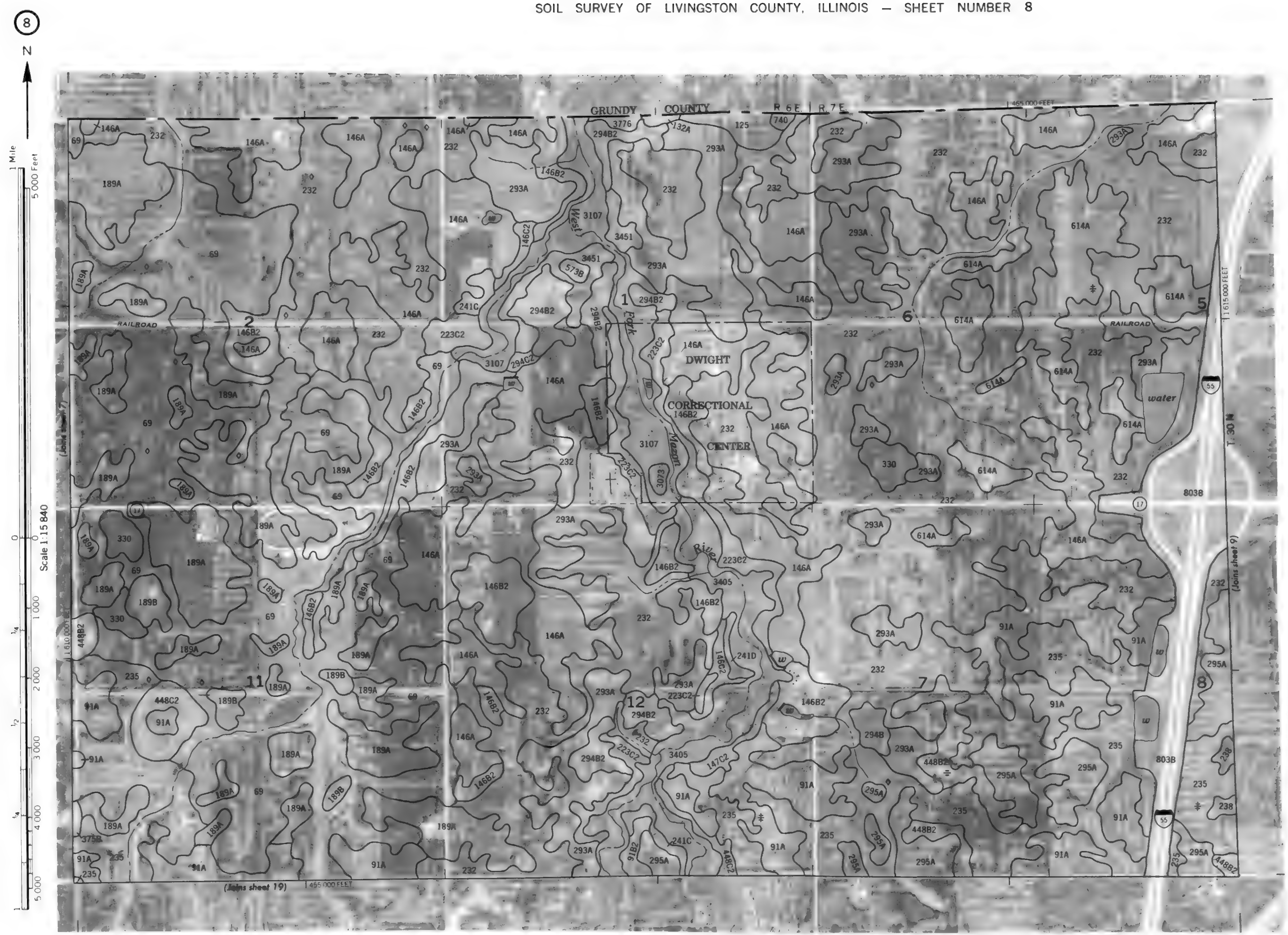
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 6

LIVINGSTON COUNTY, ILLINOIS NO. 7

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



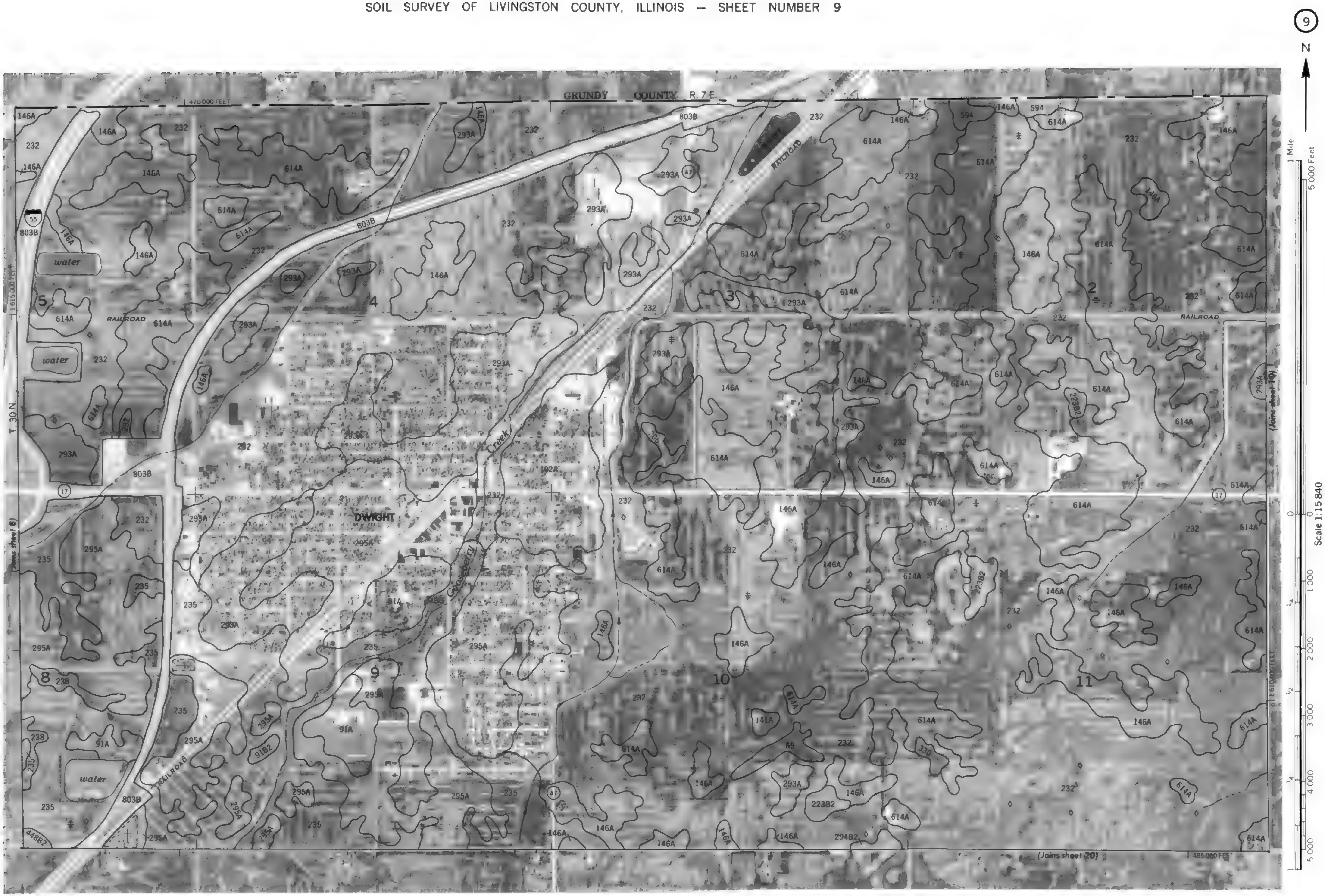


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

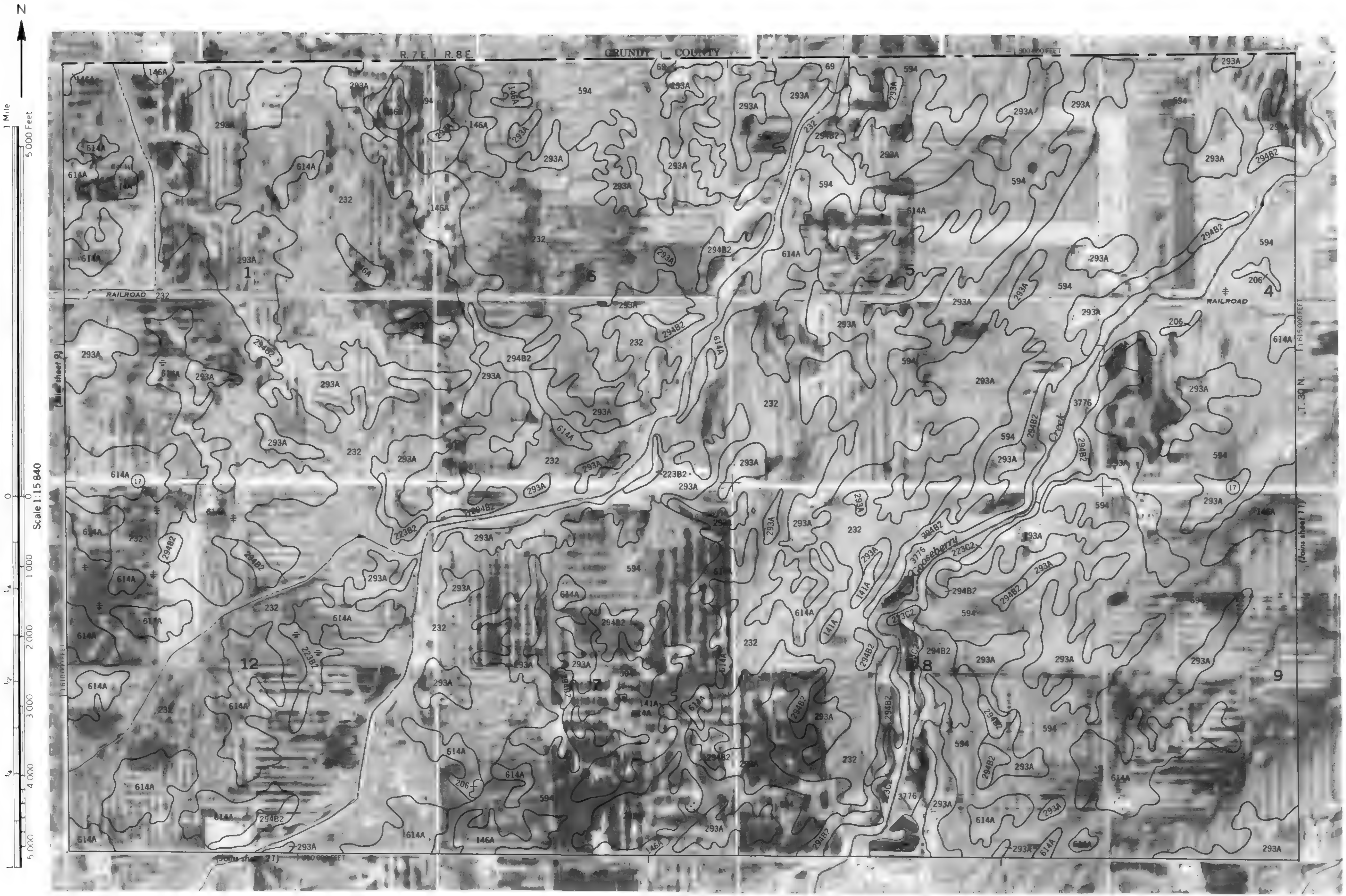
LIVINGSTON COUNTY, ILLINOIS NO. 8

LIVINGSTON COUNTY, ILLINOIS NO. 9

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



(10)



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LIVINGSTON COUNTY, ILLINOIS NO. 10

11

LIVINGSTON COUNTY, ILLINOIS NO. 11

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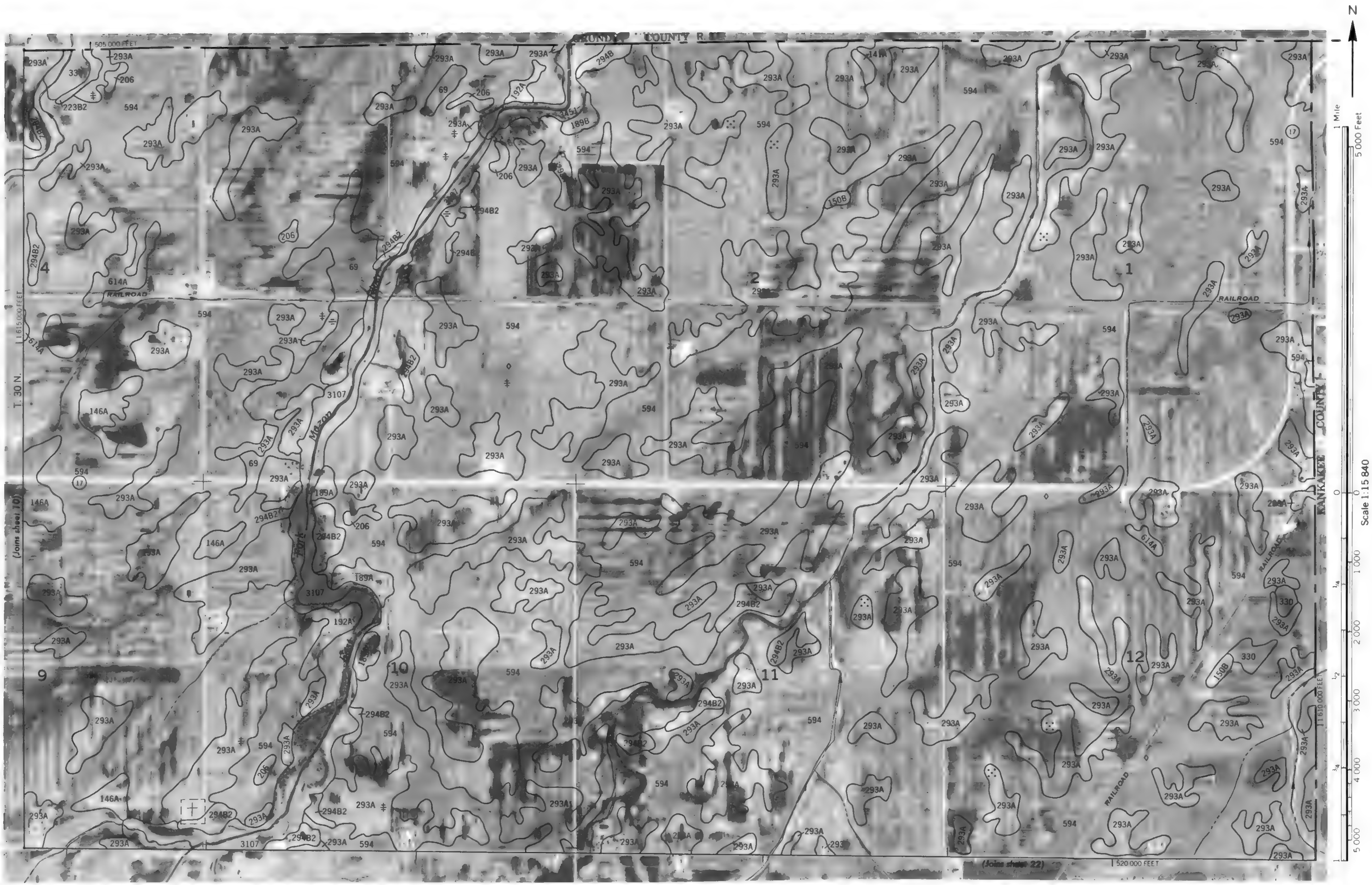

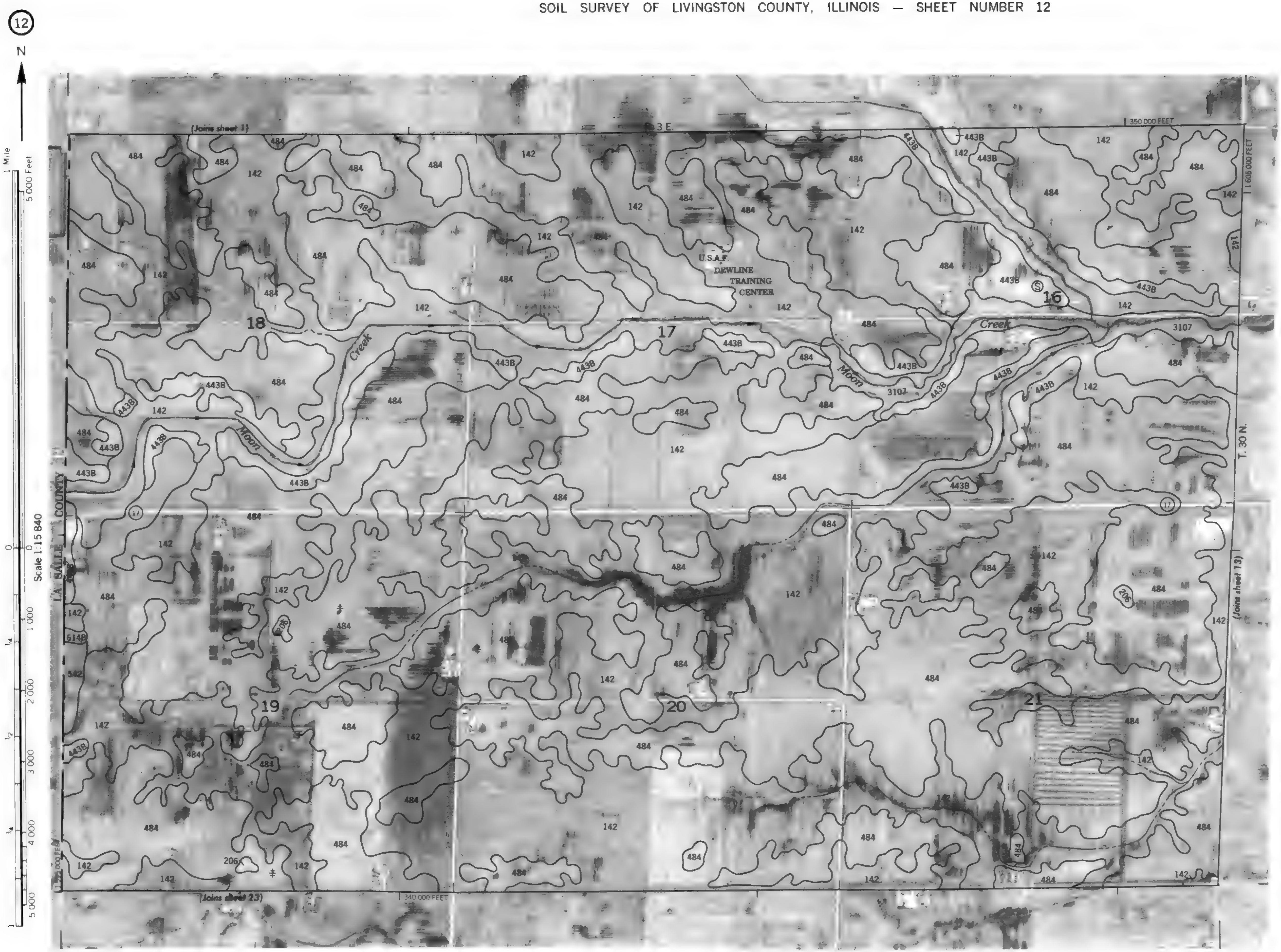

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LIVINGSTON COUNTY, ILLINOIS NO. 12

LIVINGSTON COUNTY, ILLINOIS NO. 13

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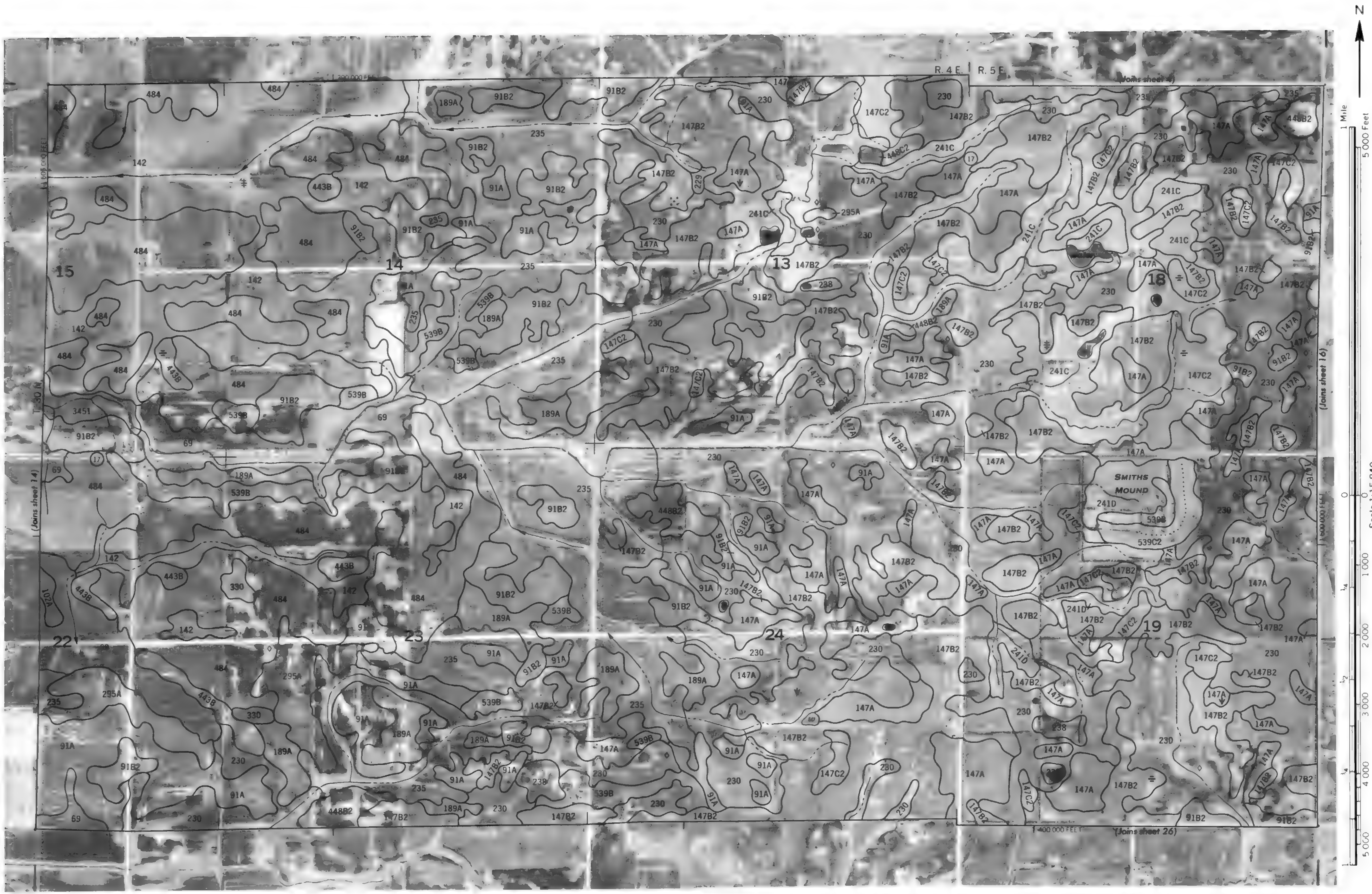
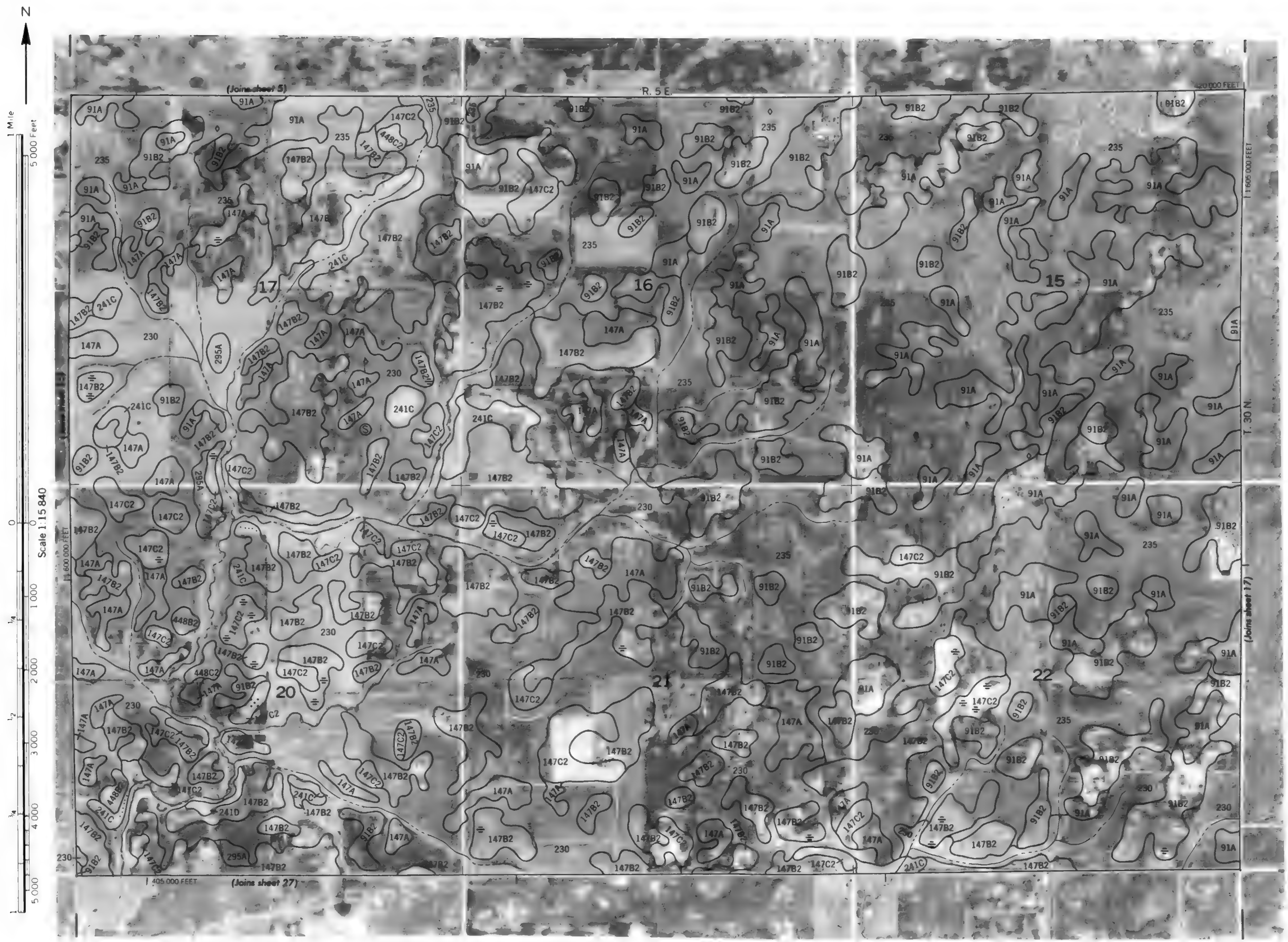
LIVINGSTON COUNTY, ILLINOIS NO. 14



LIVINGSTON COUNTY, ILLINOIS NO. 15

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

16



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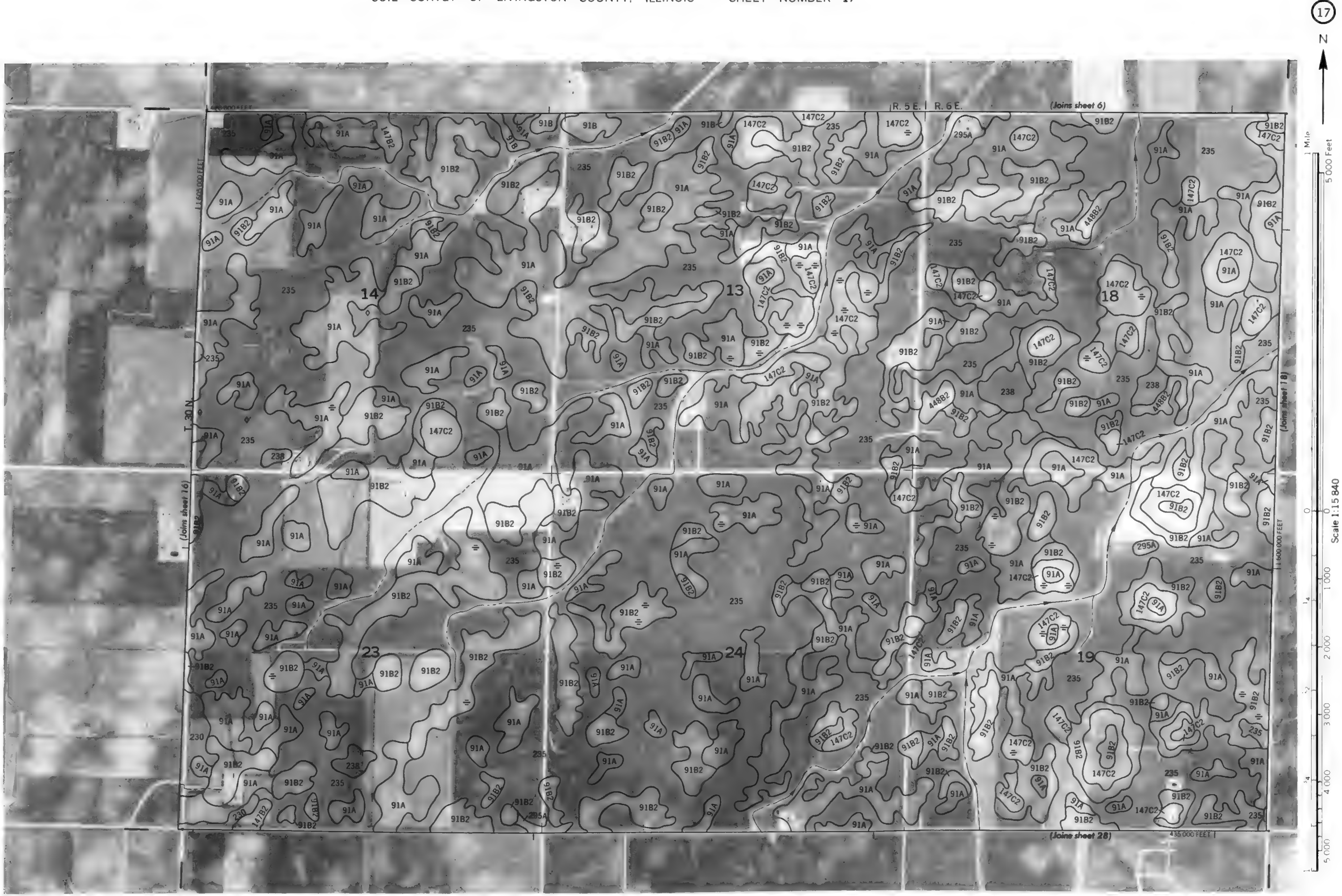
LIVINGSTON COUNTY, ILLINOIS NO. 16



LIVINGSTON COUNTY, ILLINOIS NO. 17

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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LIVINGSTON COUNTY, ILLINOIS NO. 18

LIVINGSTON COUNTY, ILLINOIS NO. 19

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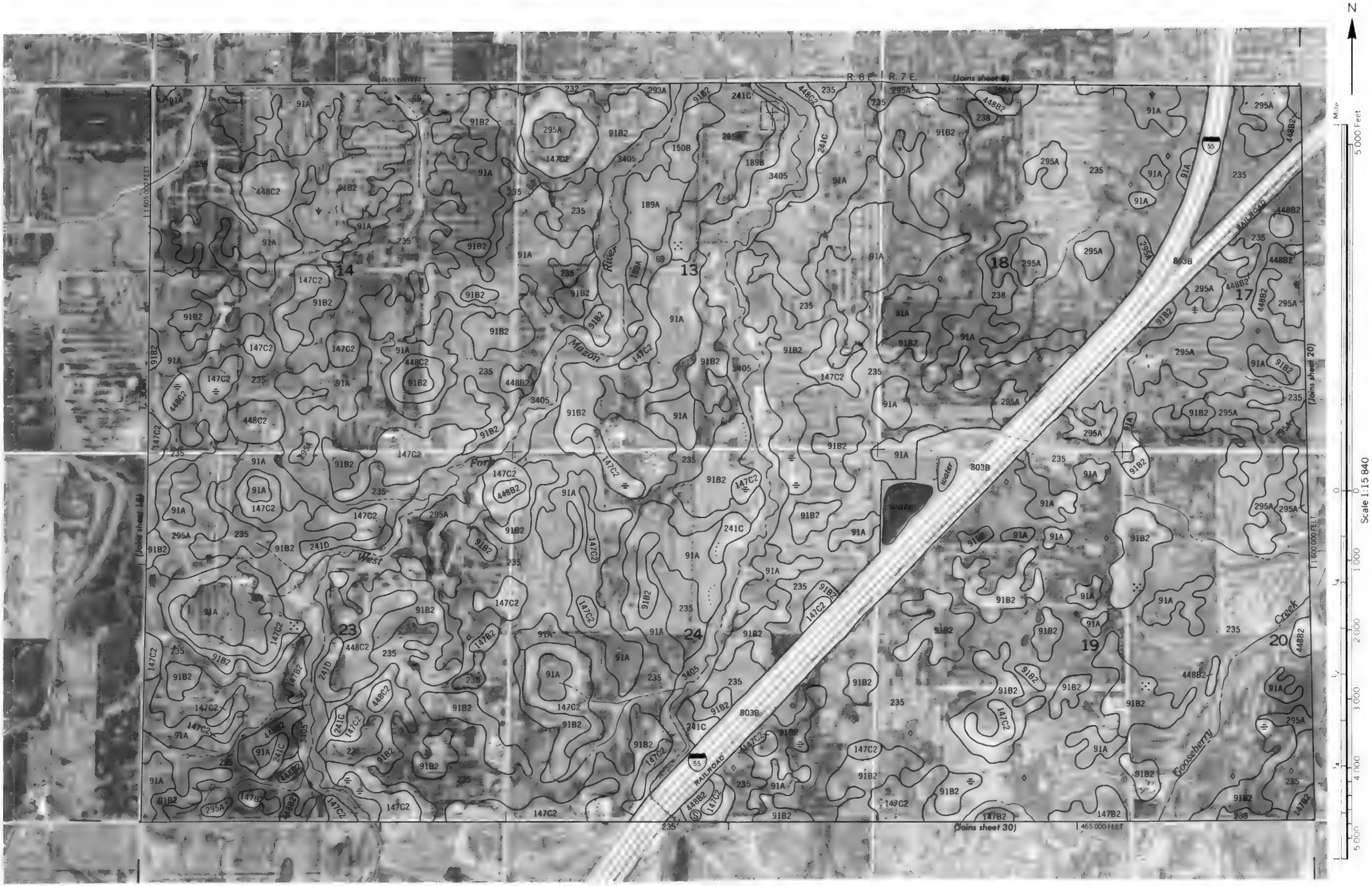

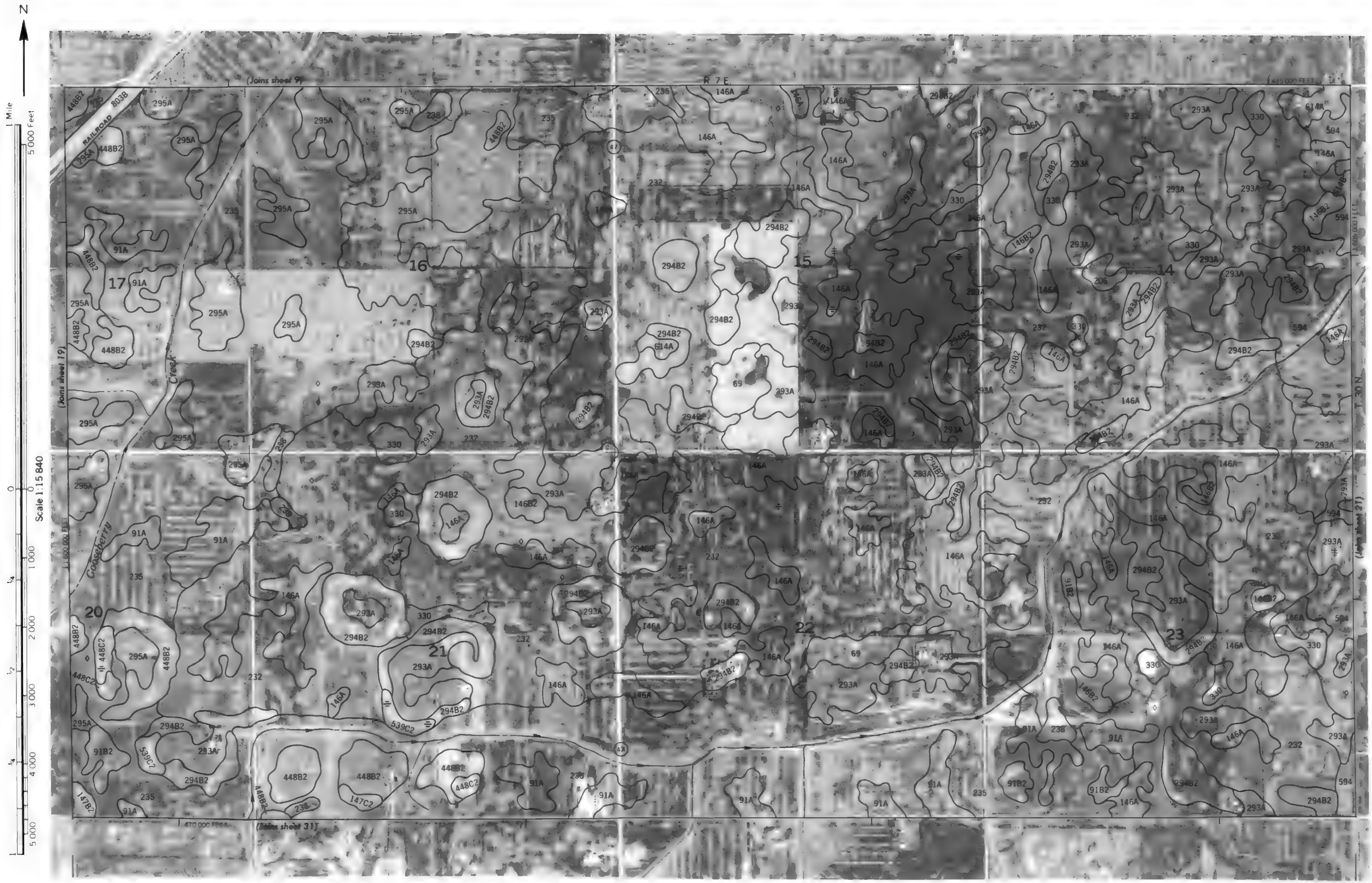

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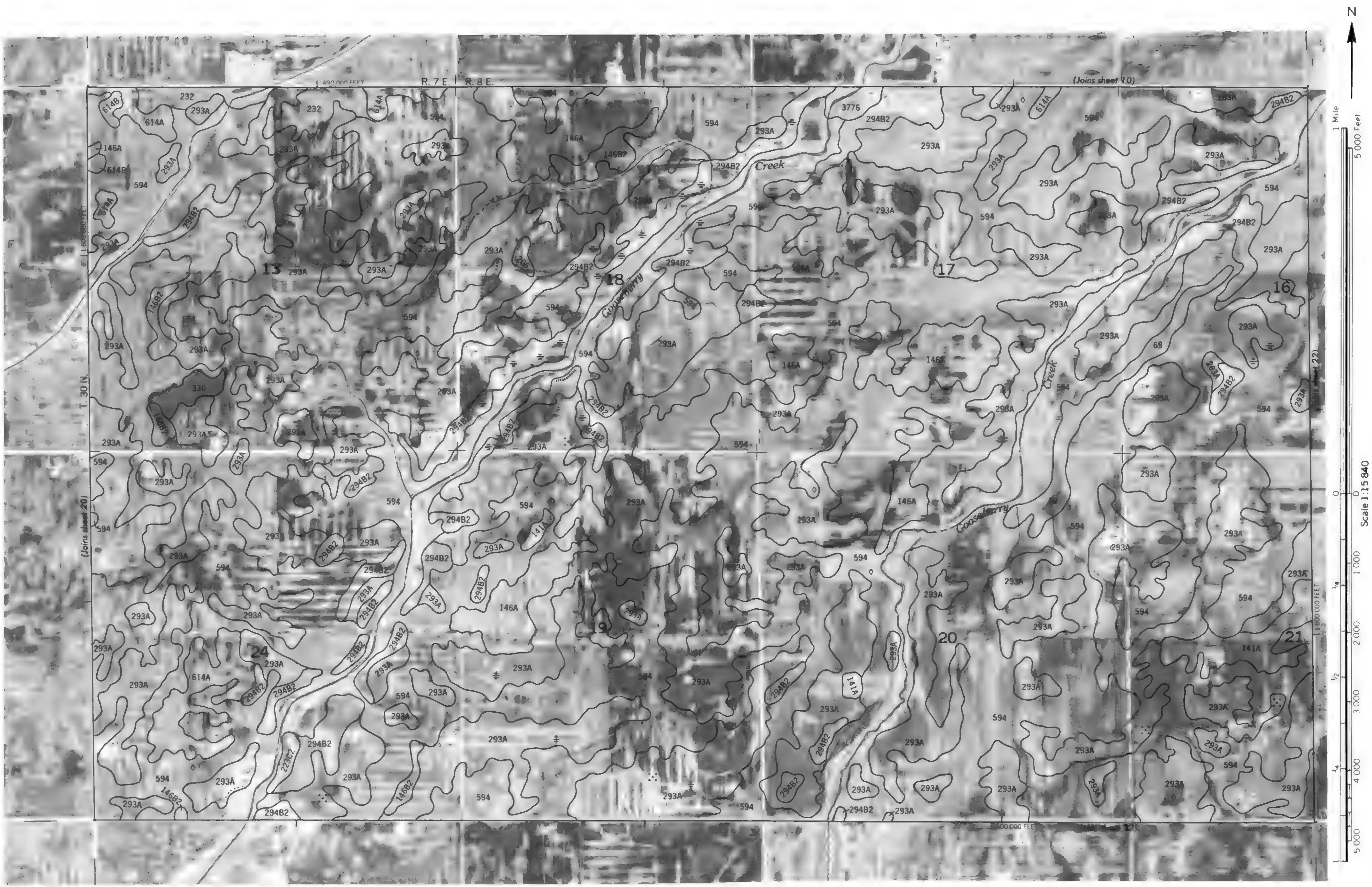
LIVINGSTON COUNTY, ILLINOIS NO. 20



LIVINGSTON COUNTY, ILLINOIS NO. 21

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LIVINGSTON COUNTY, ILLINOIS NO. 23

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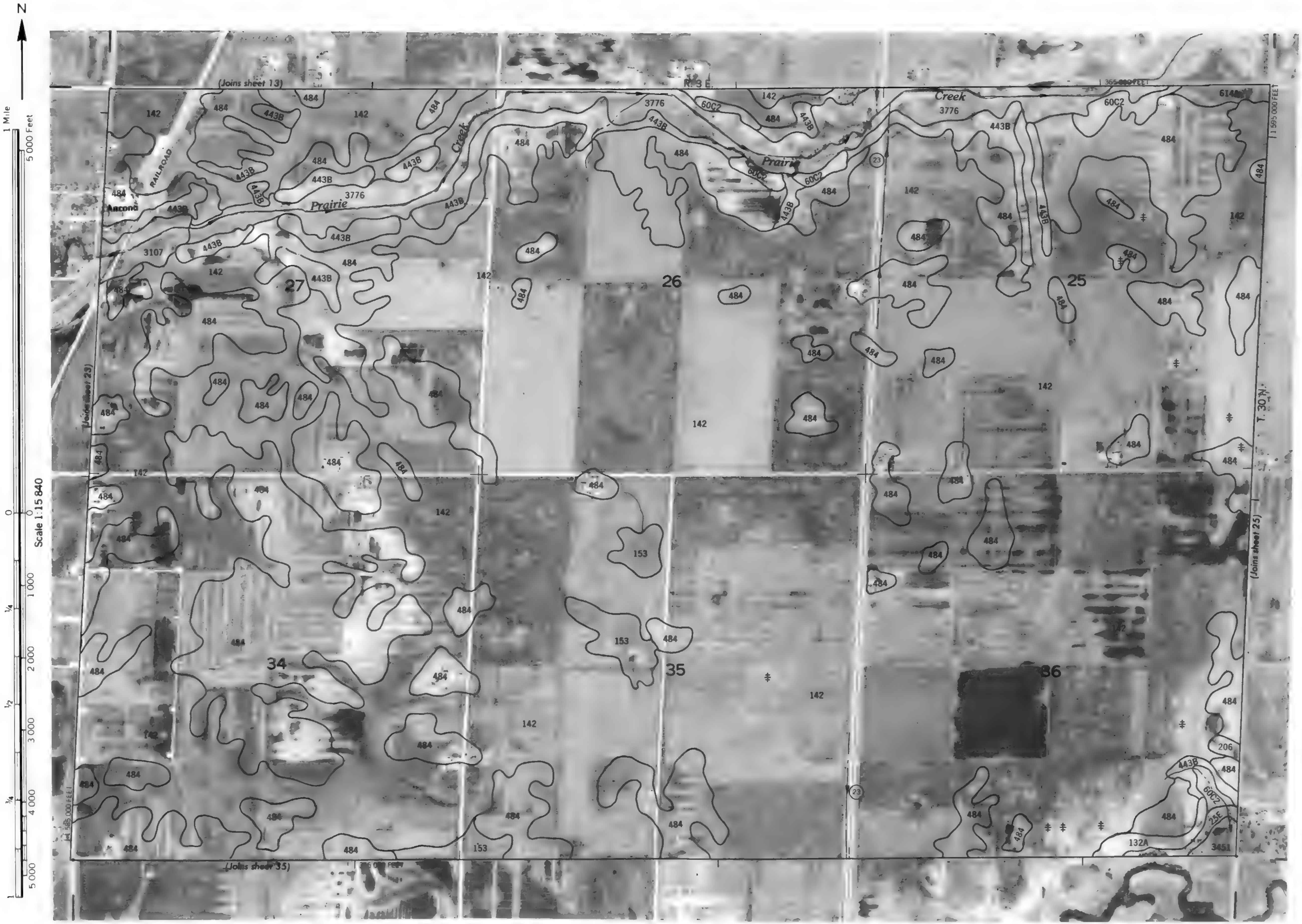
24



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LIVINGSTON COUNTY, ILLINOIS NO. 25

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27

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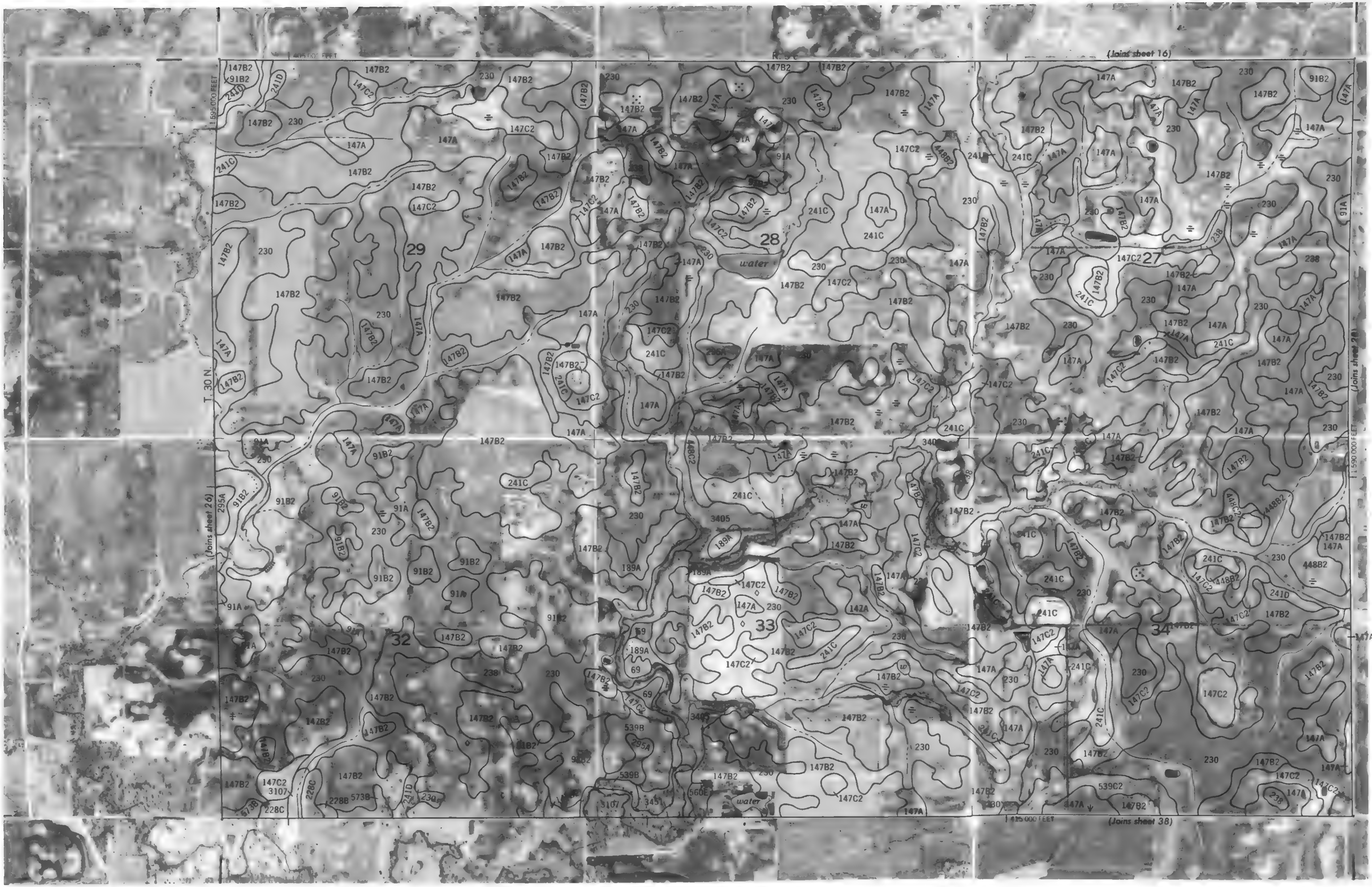


1 Mile

5 000 Feet

0

1 000

2 000

3 000

4 000

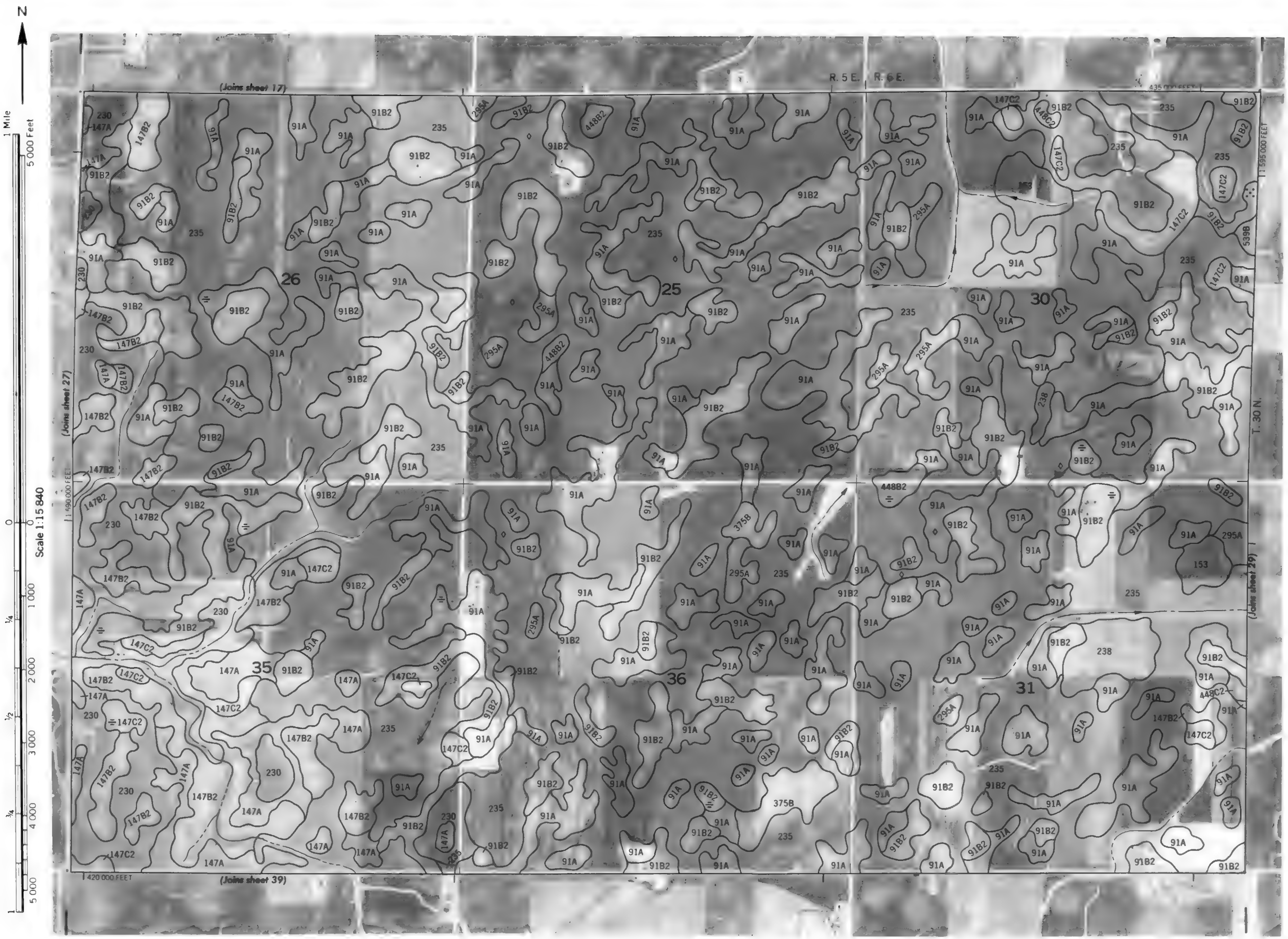
5 000

Scale 1:15 840

LIVINGSTON COUNTY, ILLINOIS NO. 27

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

28



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LIVINGSTON COUNTY, ILLINOIS NO. 28

29

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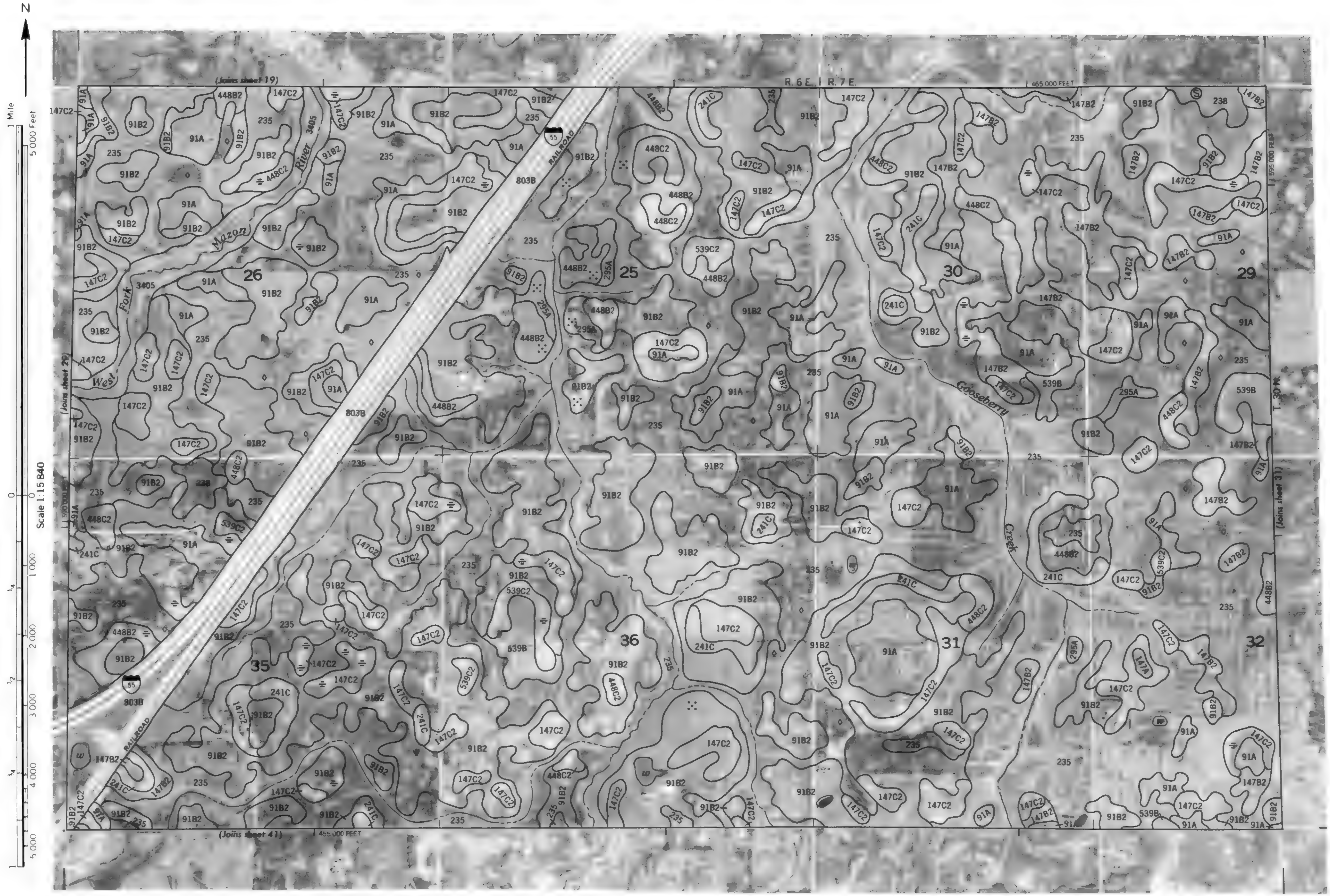
SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 30



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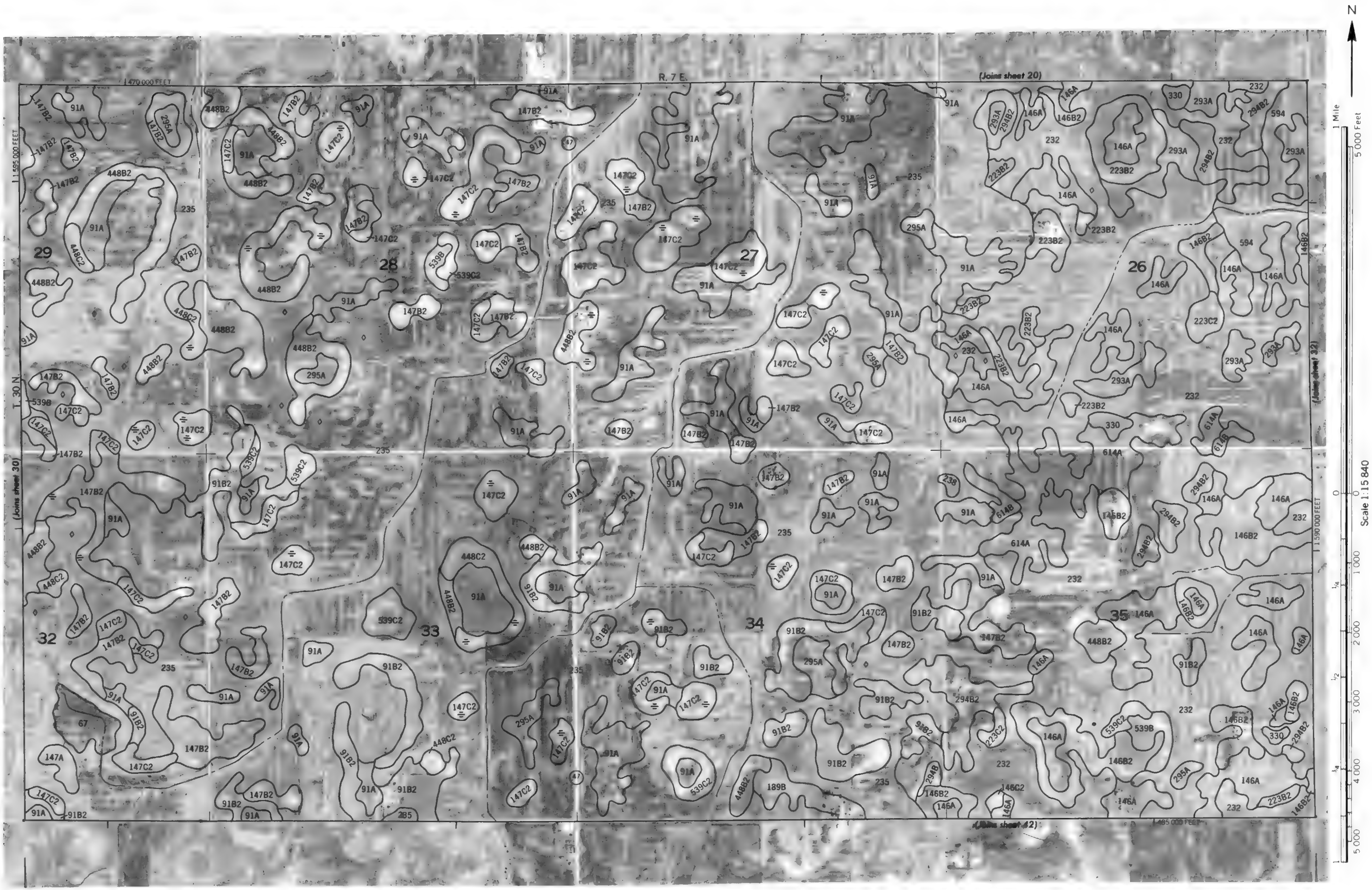
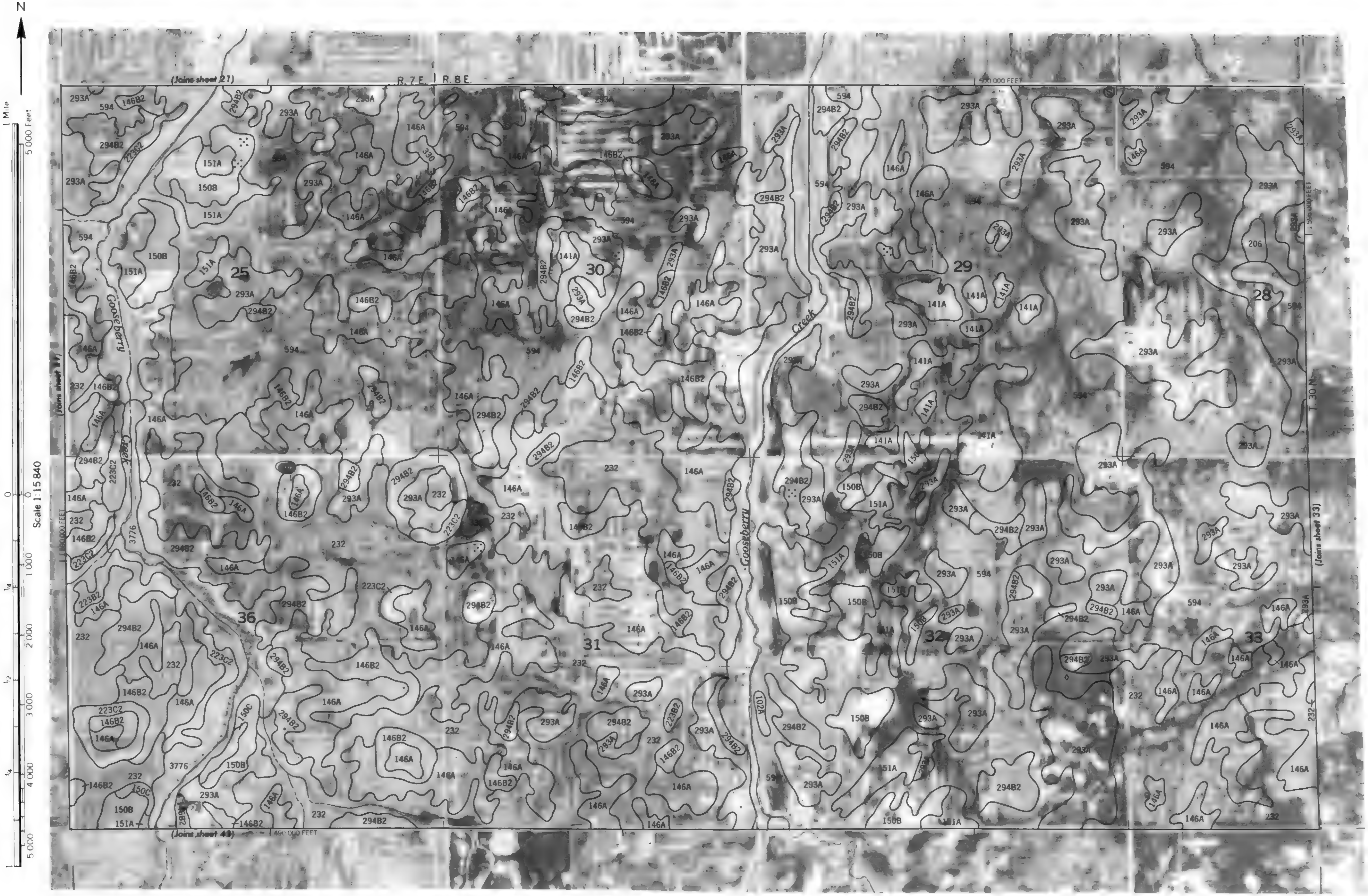


LIVINGSTON COUNTY, ILLINOIS NO. 31

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 32



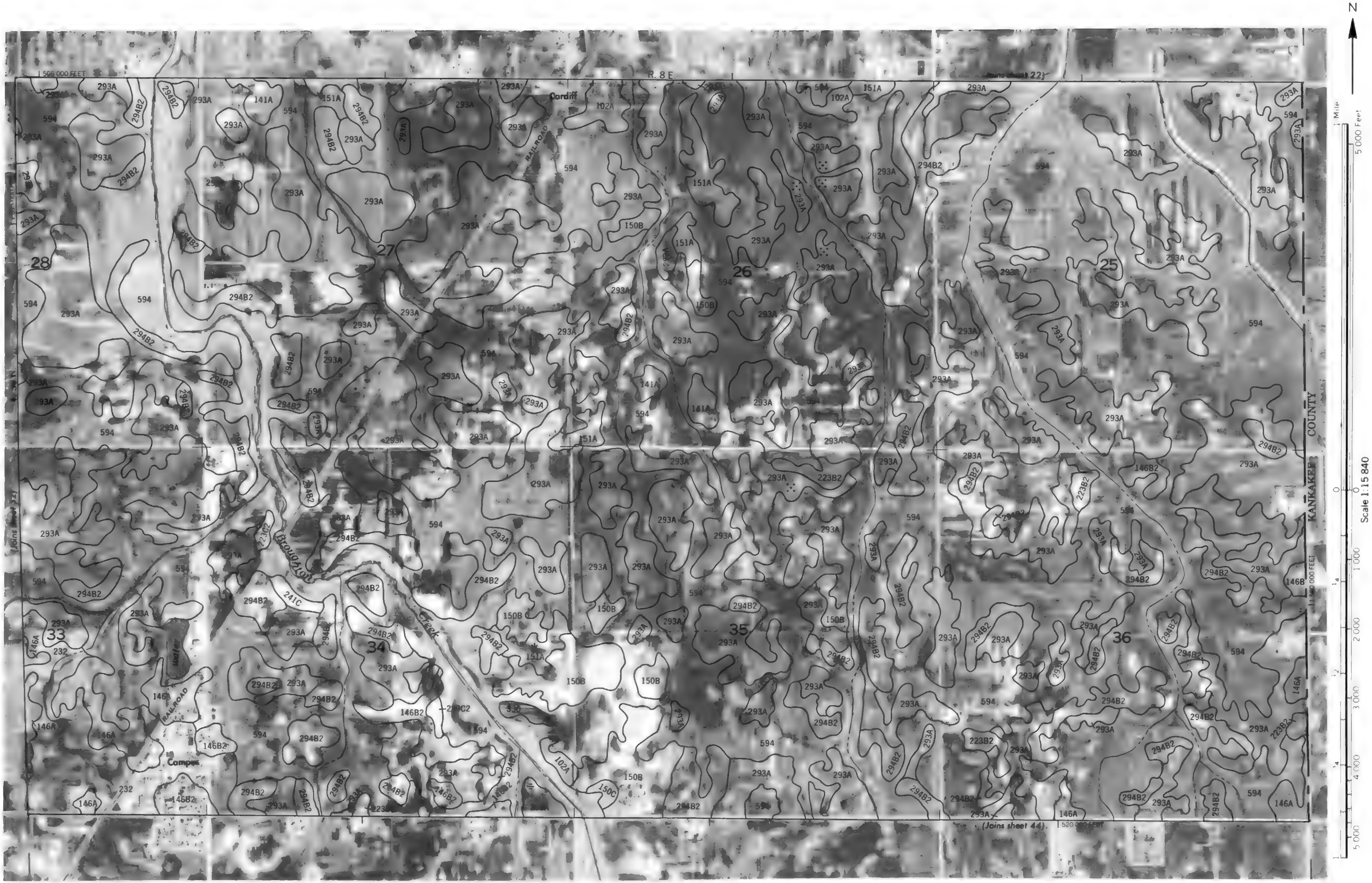
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

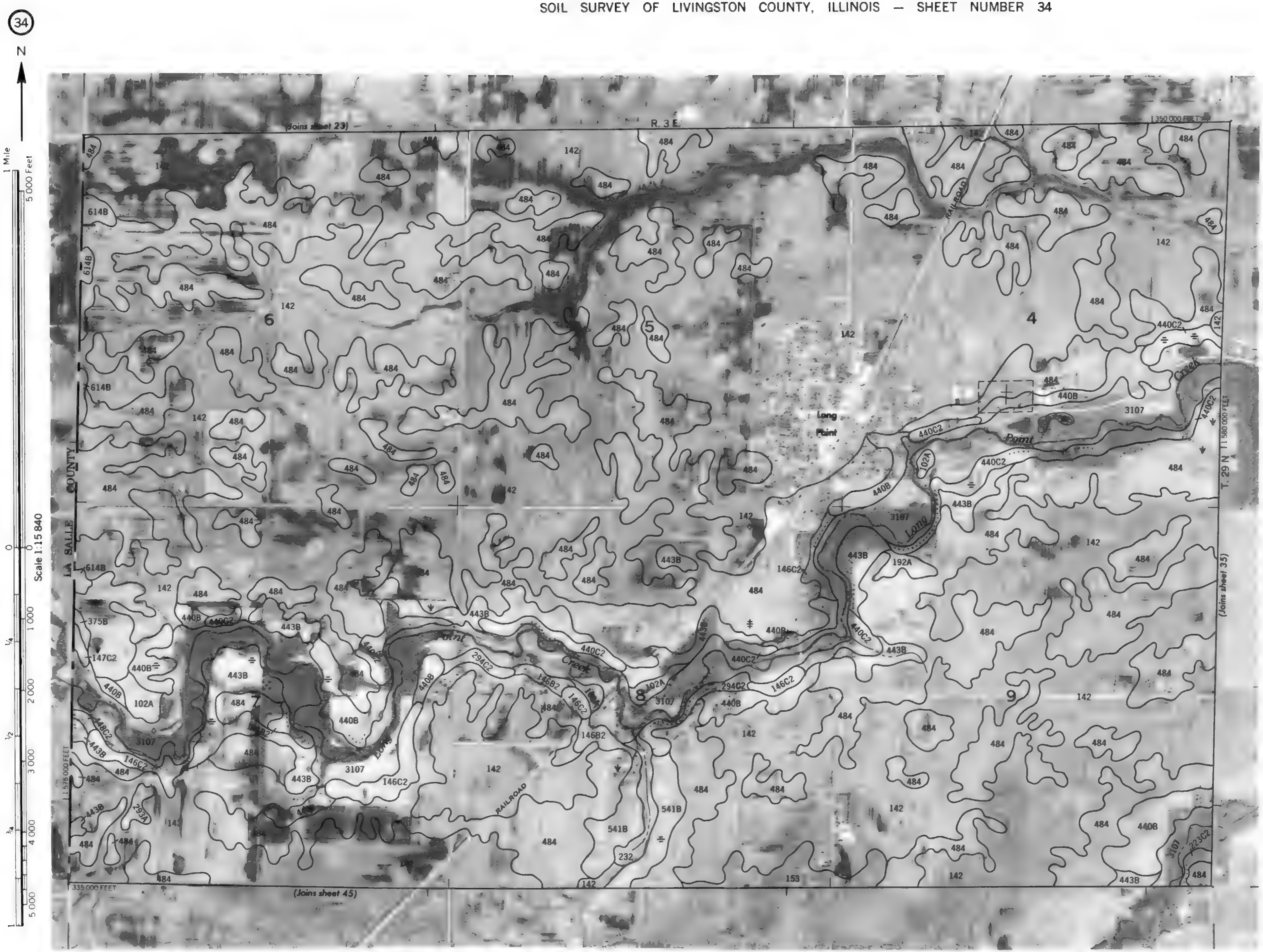
LIVINGSTON COUNTY, ILLINOIS NO. 32

(33)

LIVINGSTON COUNTY, ILLINOIS NO. 33

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





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LIVINGSTON COUNTY, ILLINOIS NO. 34

35

LIVINGSTON COUNTY, ILLINOIS NO. 35

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SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 36

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LIVINGSTON COUNTY, ILLINOIS NO. 36

LIVINGSTON COUNTY, ILLINOIS NO. 37

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38

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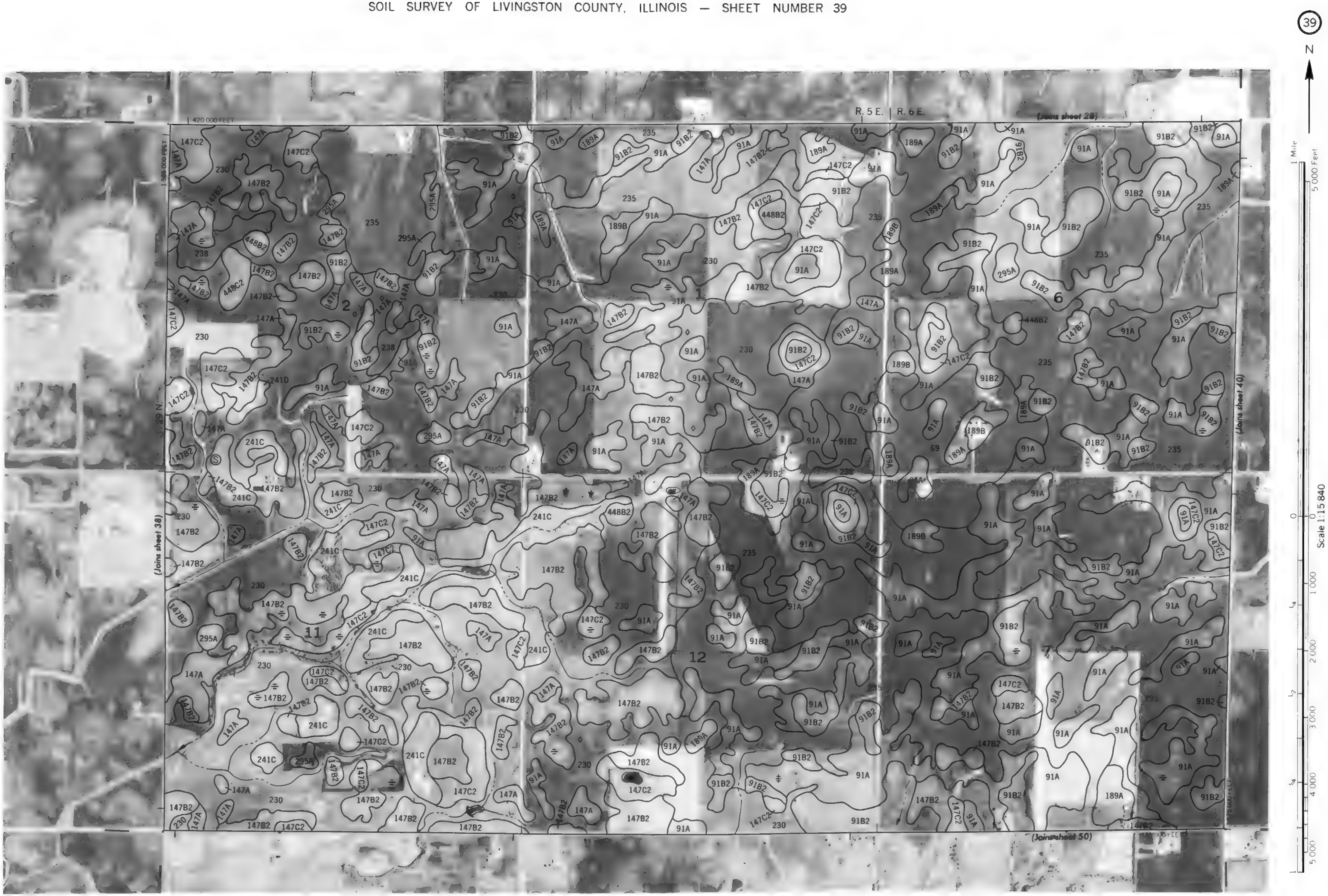

LIVINGSTON COUNTY, ILLINOIS NO. 39

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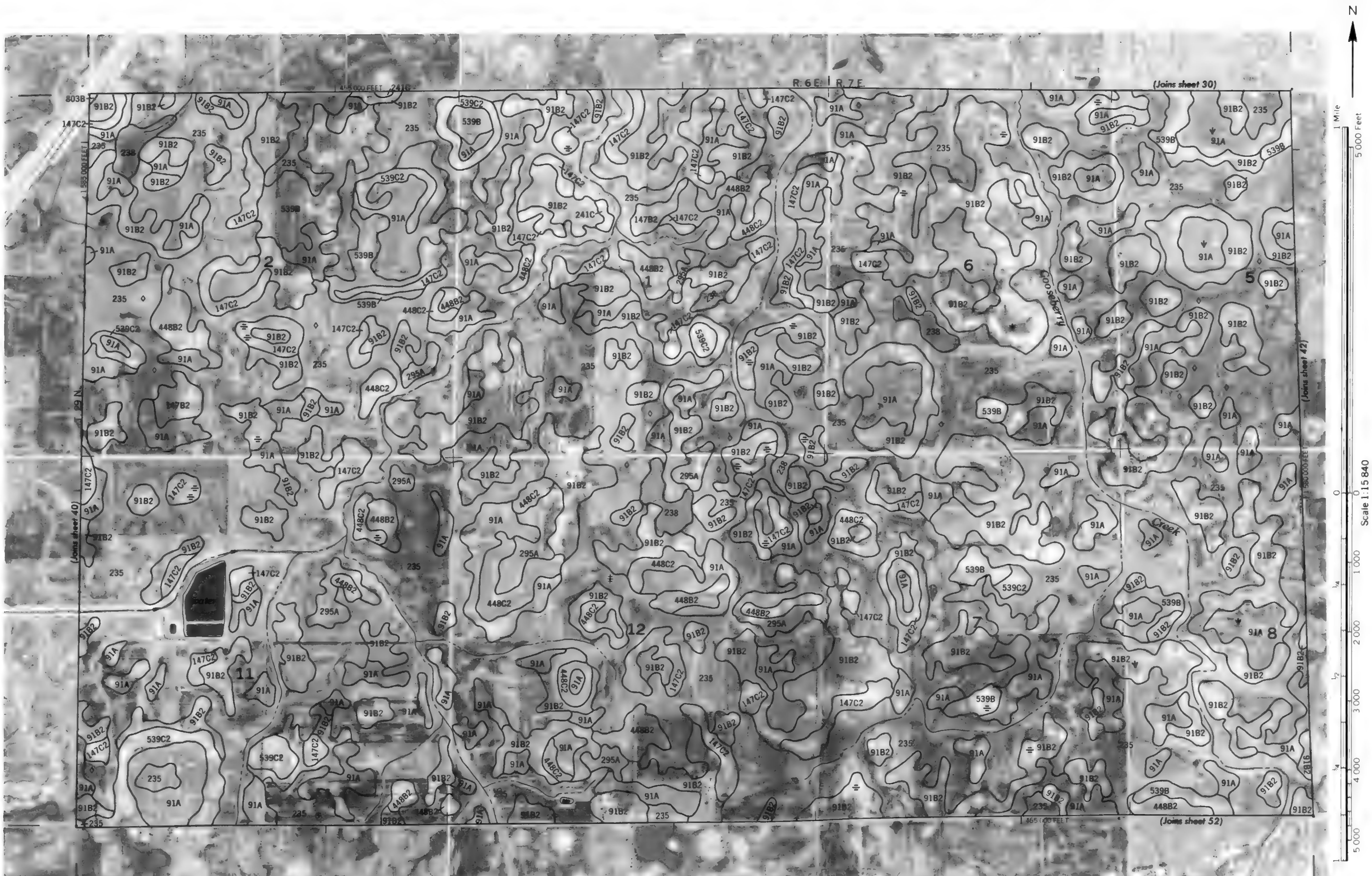
LIVINGSTON COUNTY, ILLINOIS NO. 40

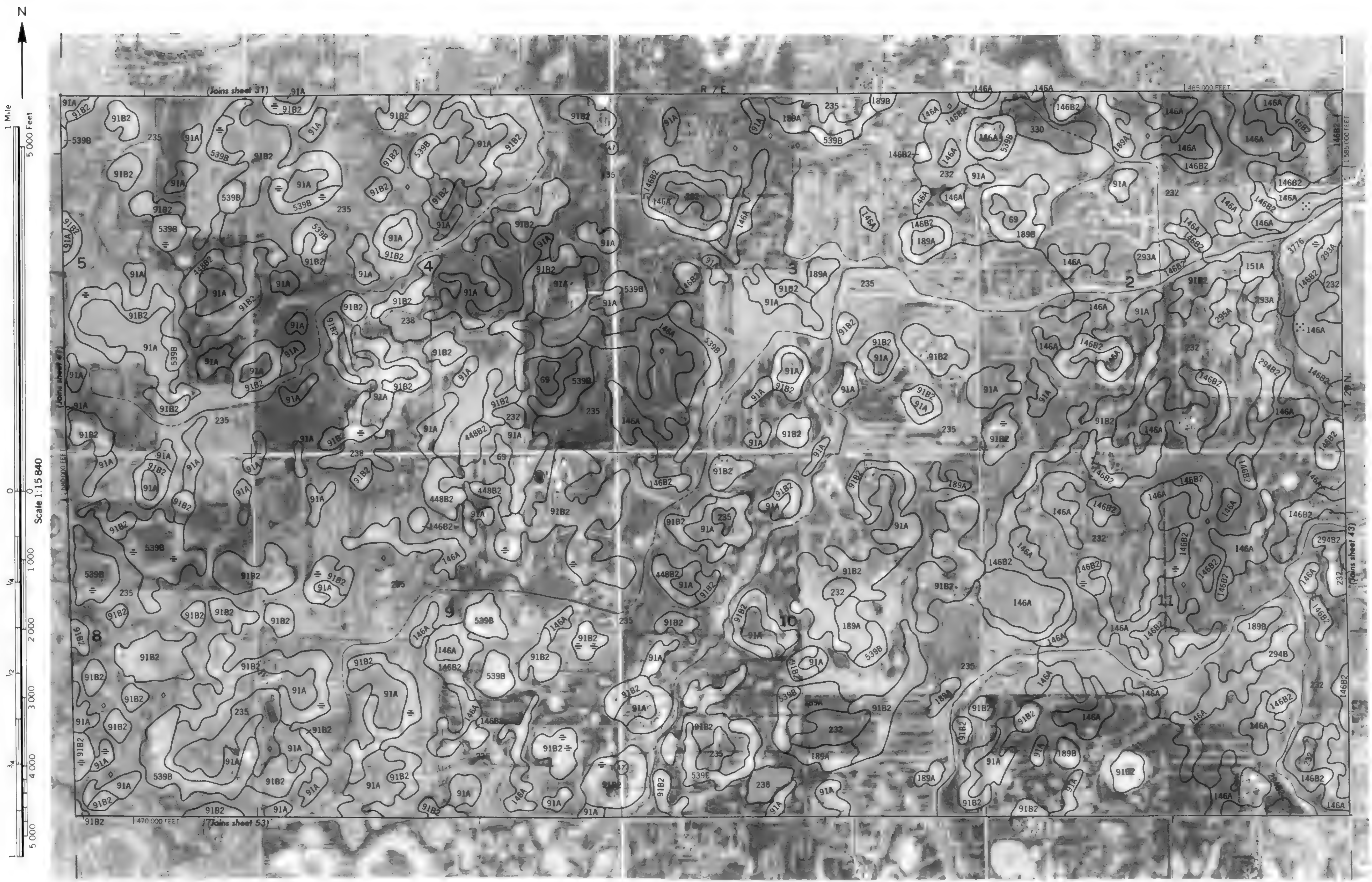
41



LIVINGSTON COUNTY, ILLINOIS NO. 41

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

42



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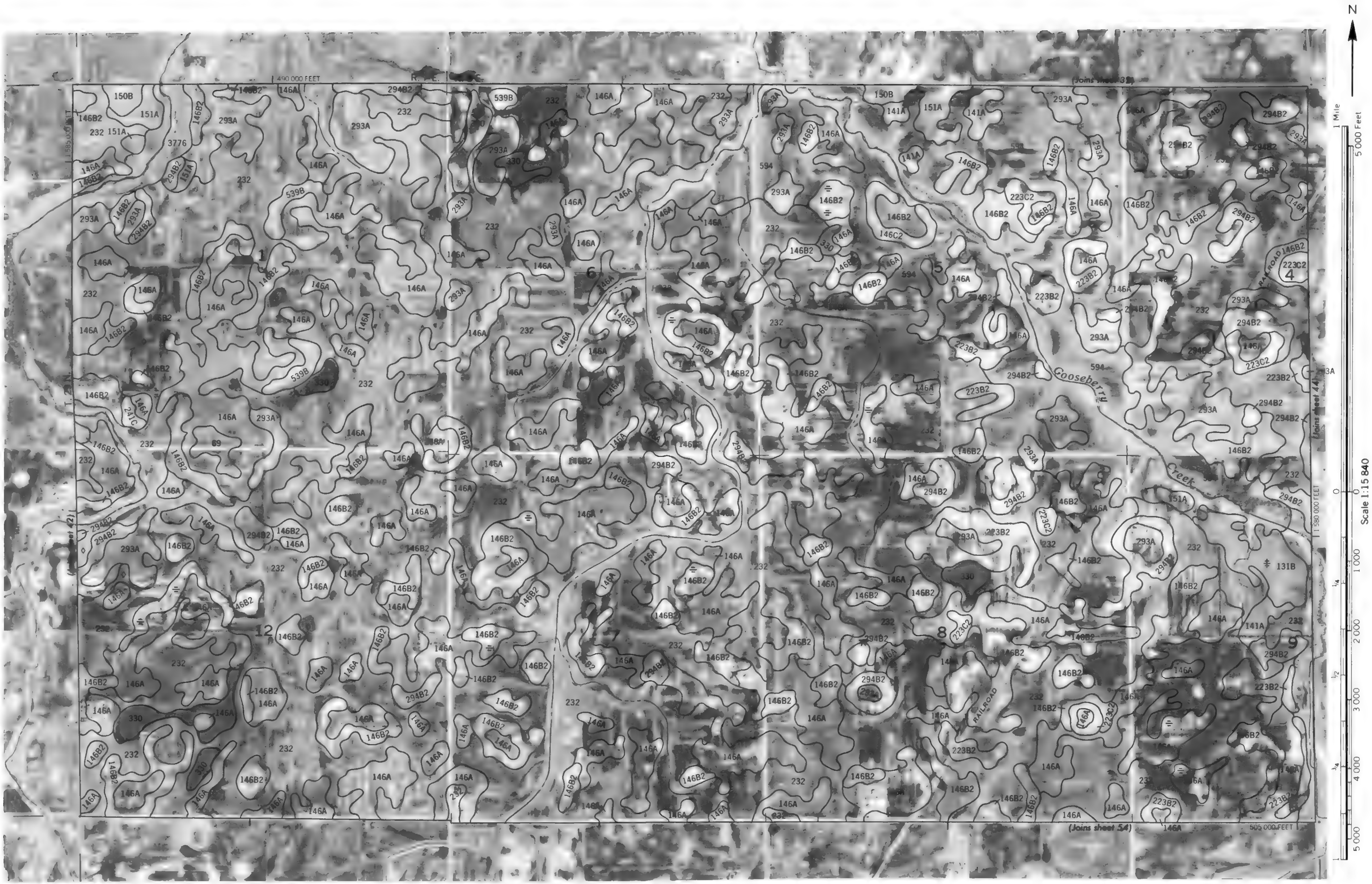
LIVINGSTON COUNTY, ILLINOIS NO. 42



LIVINGSTON COUNTY, ILLINOIS NO. 43

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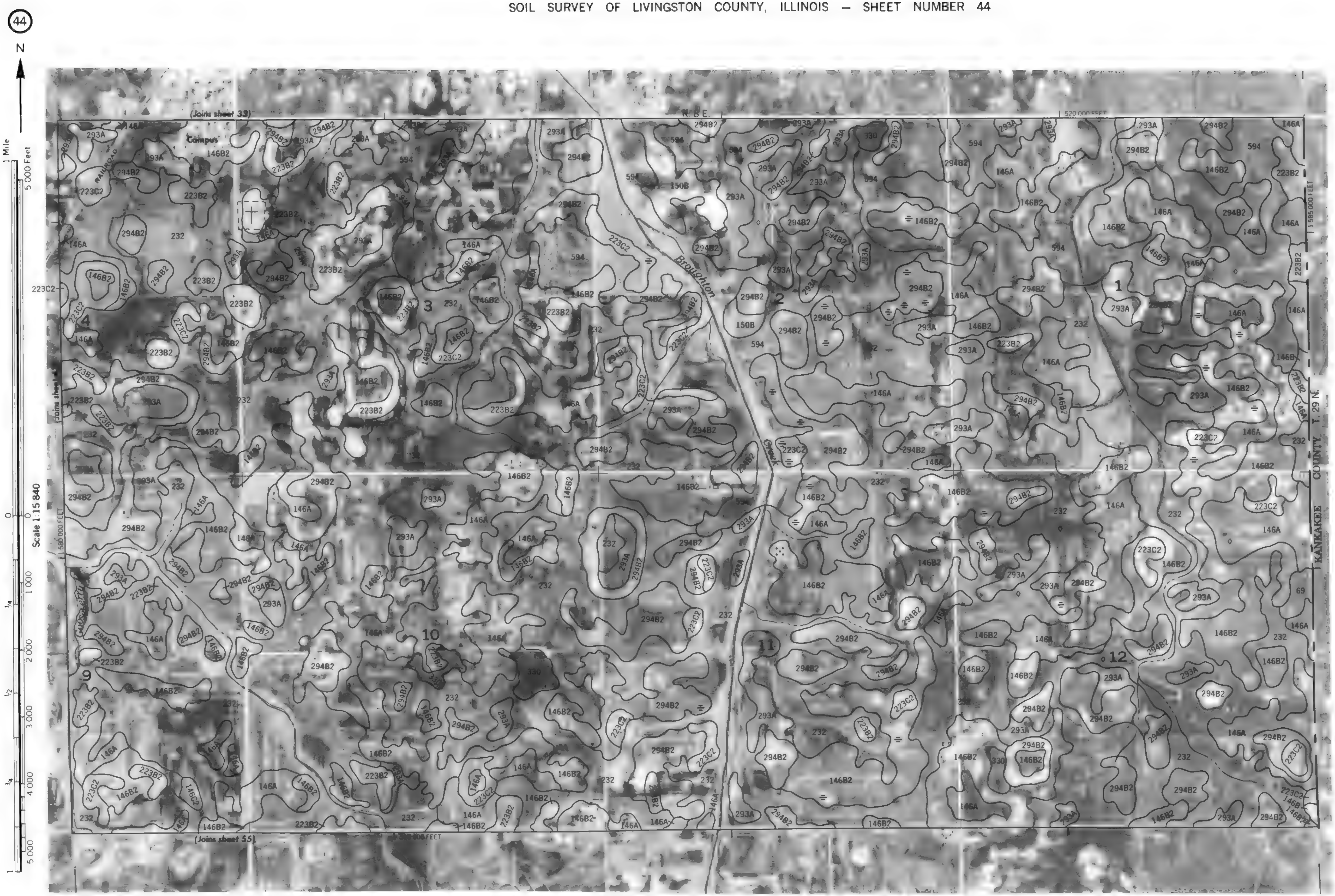

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LIVINGSTON COUNTY, ILLINOIS NO. 45

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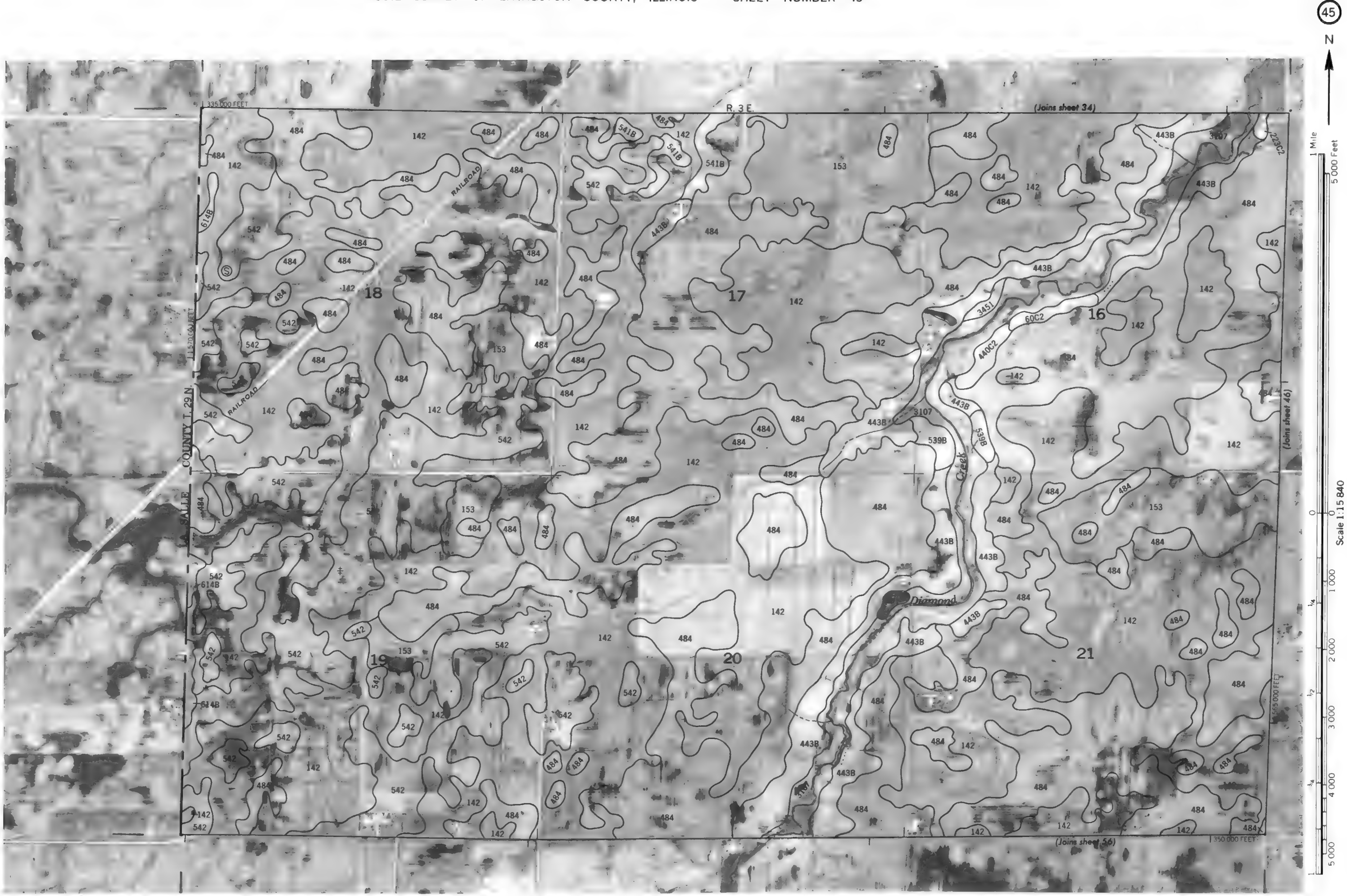

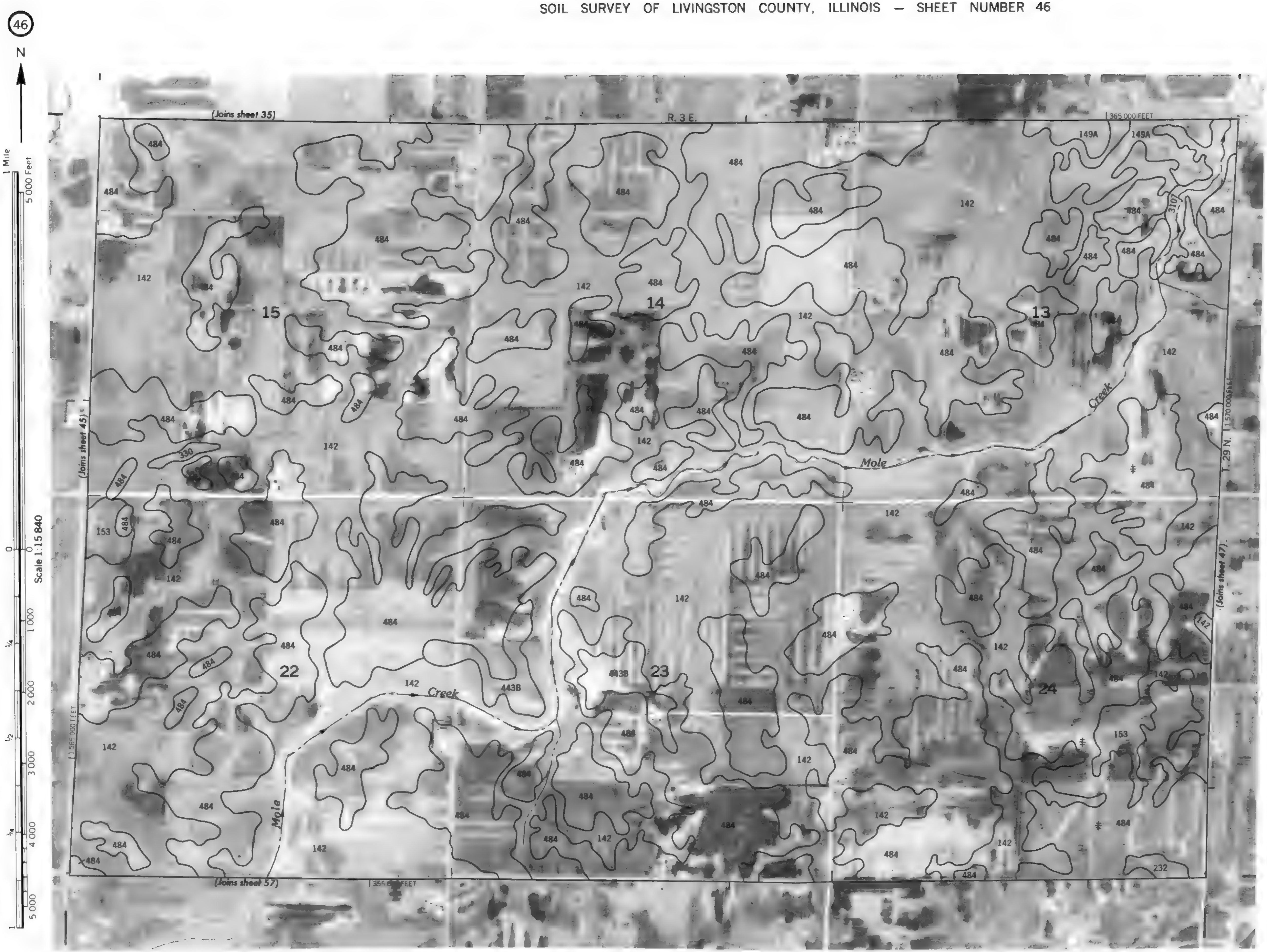

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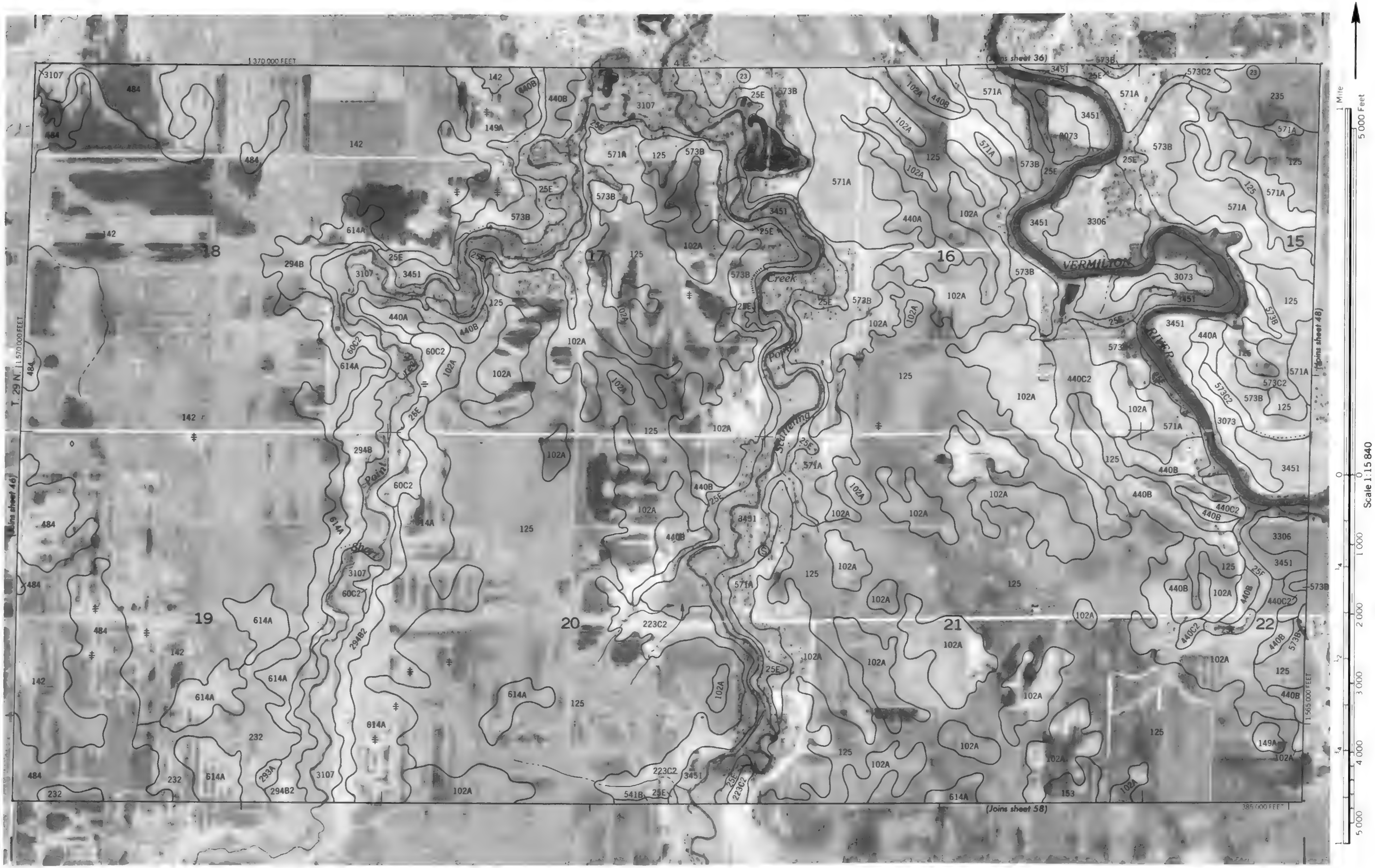
LIVINGSTON COUNTY, ILLINOIS NO. 46

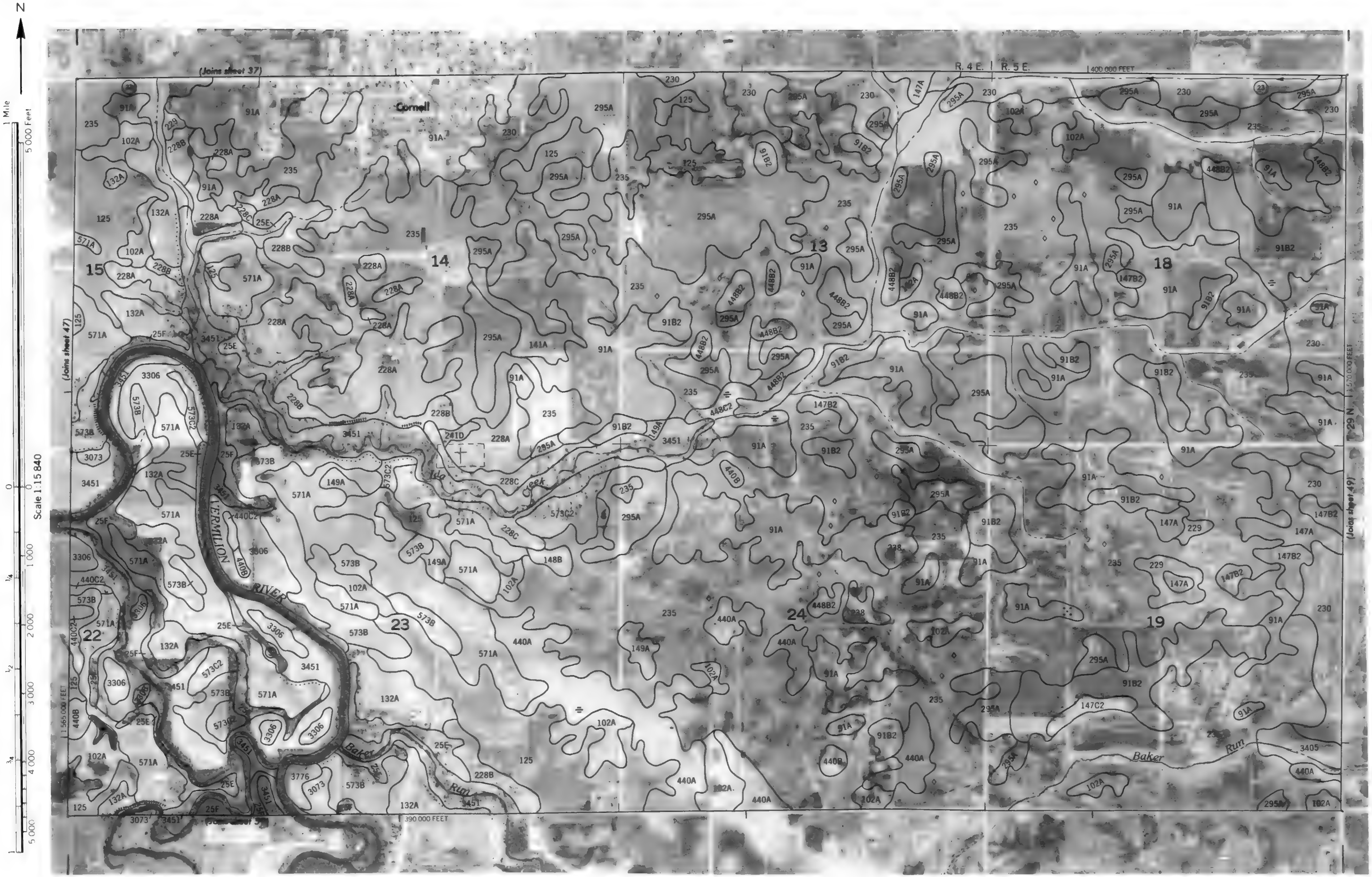
47

LIVINGSTON COUNTY, ILLINOIS NO. 47

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



48



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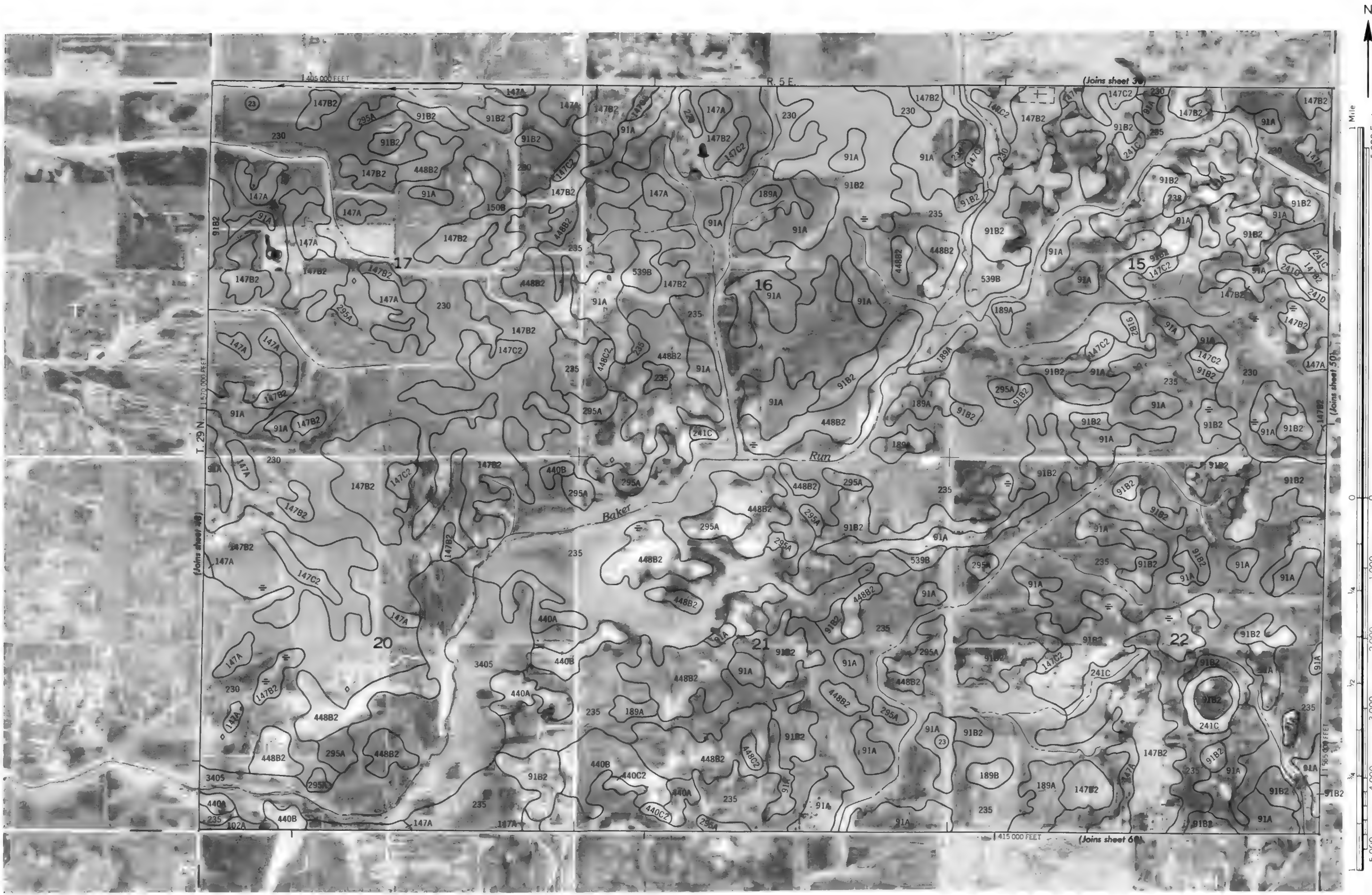
LIVINGSTON COUNTY, ILLINOIS NO. 48

LIVINGSTON COUNTY, ILLINOIS NO. 49

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



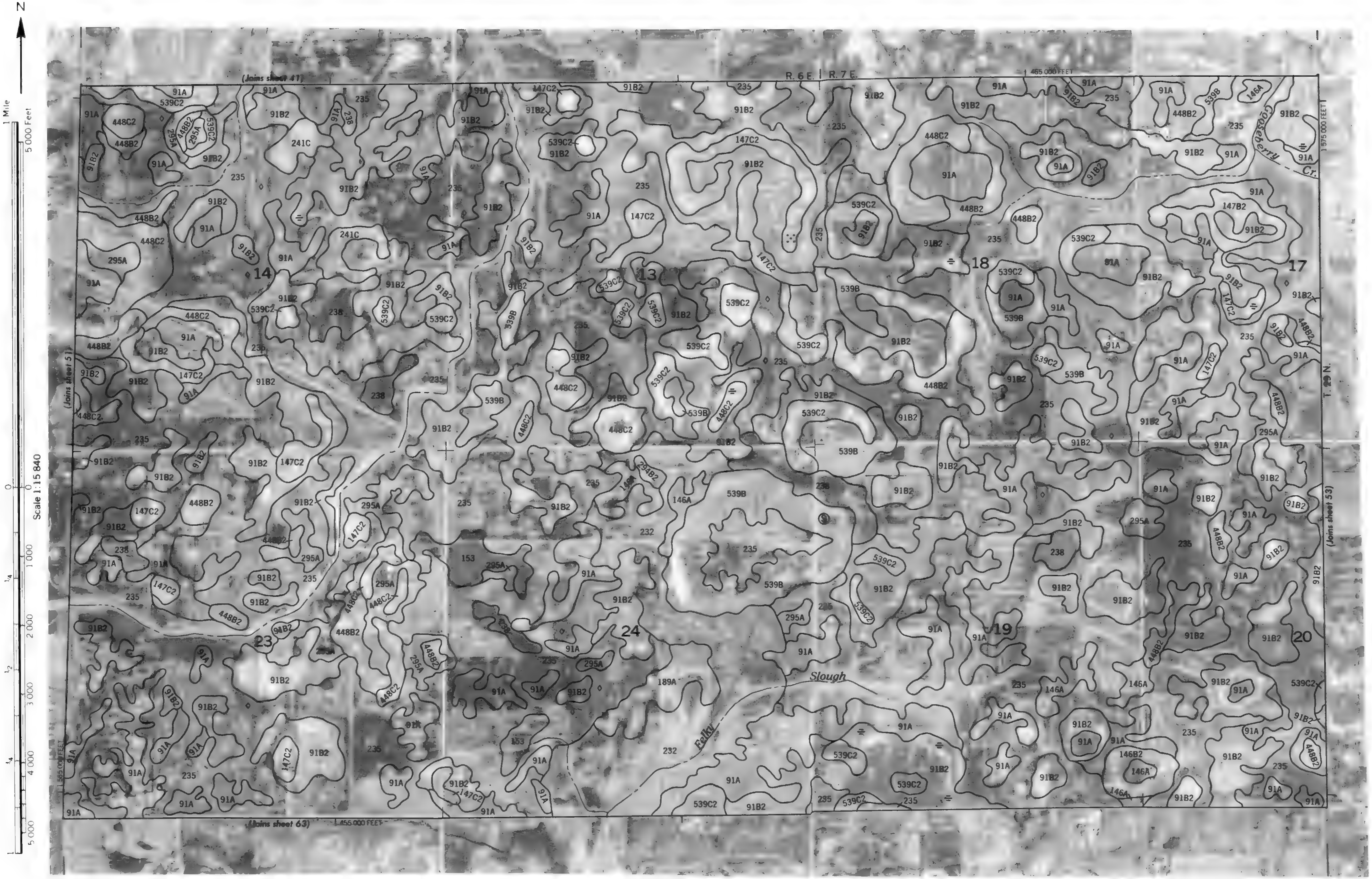
50

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 50

LIVINGSTON COUNTY, ILLINOIS NO. 51

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



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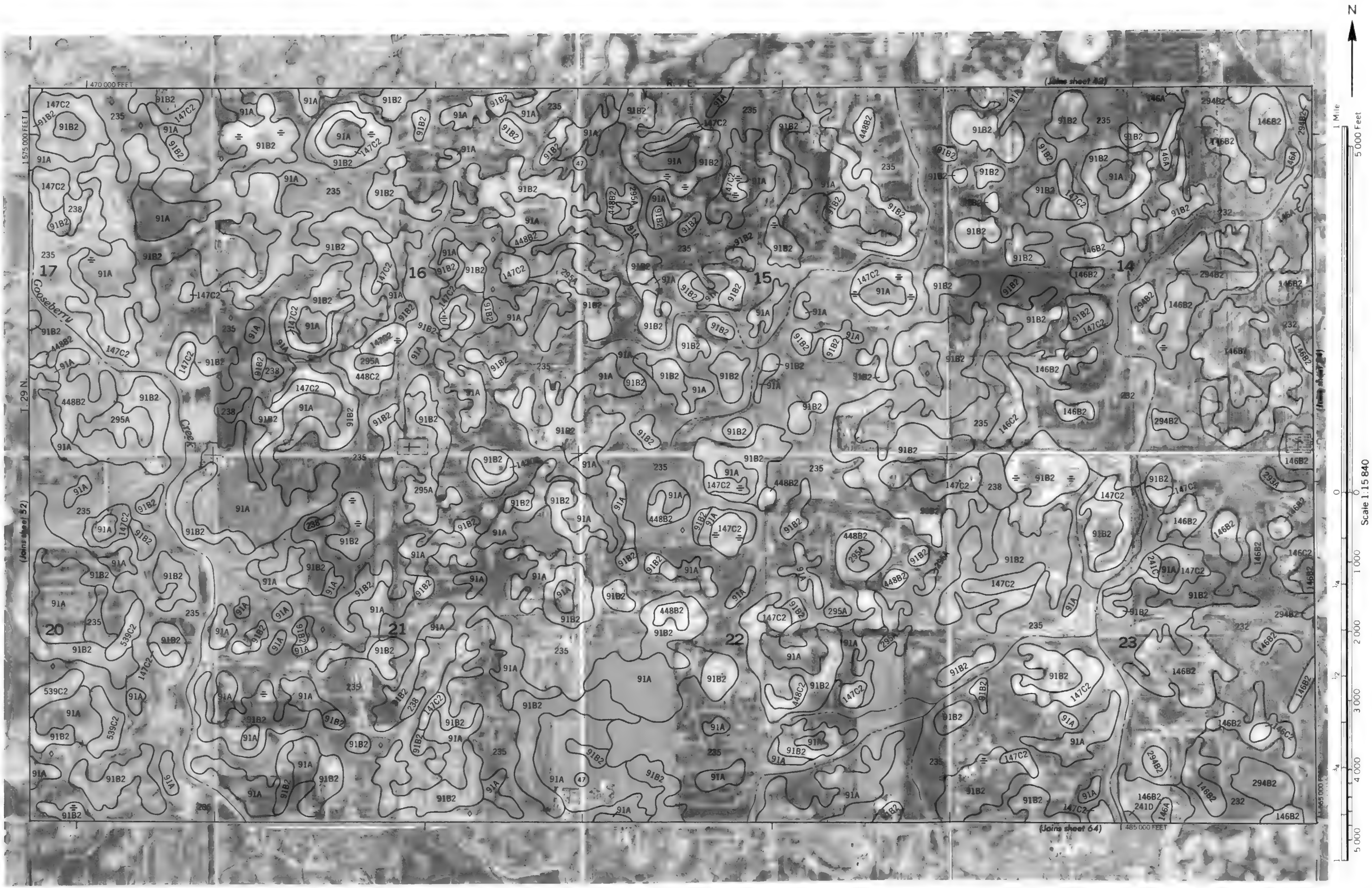

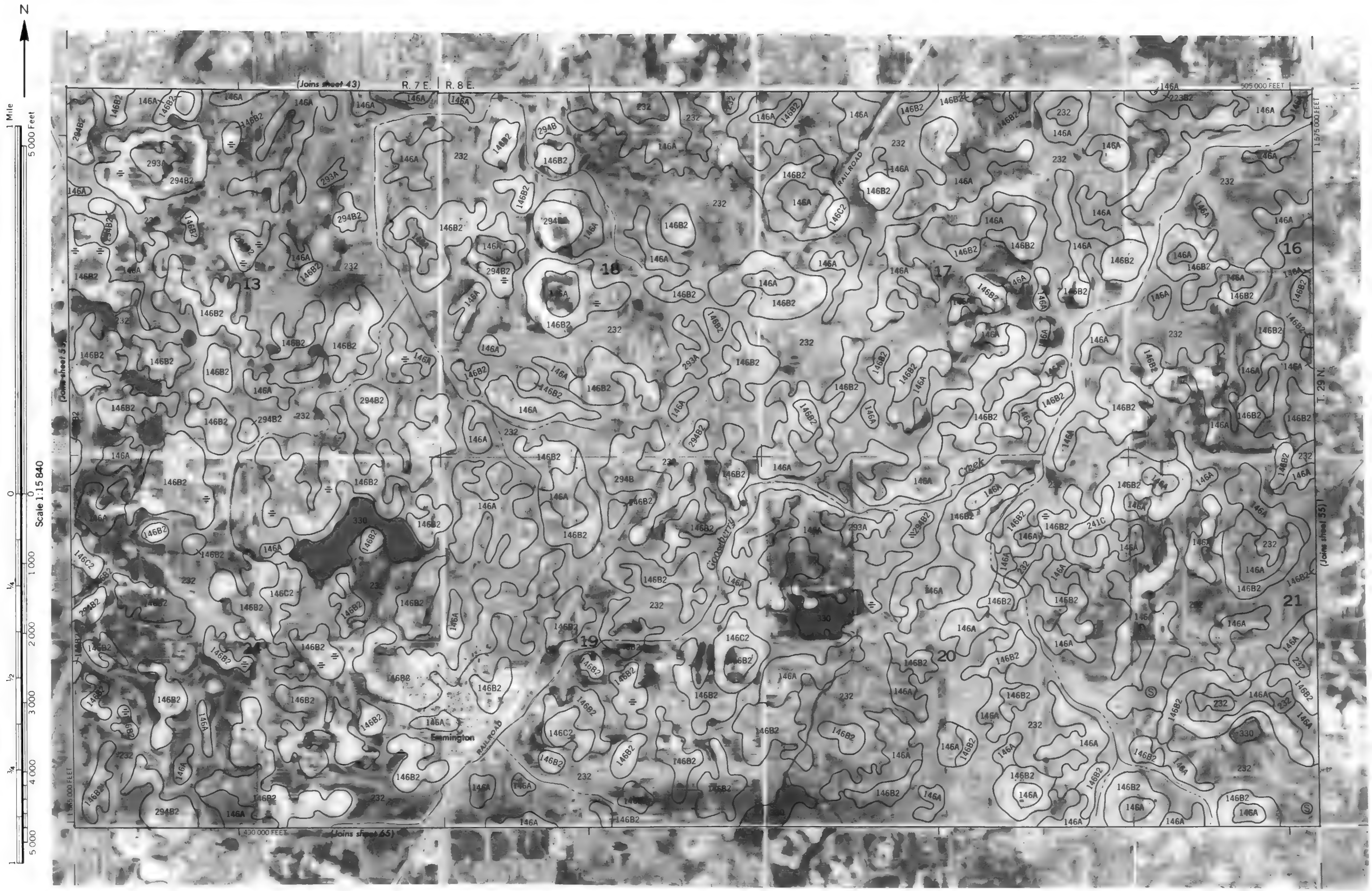

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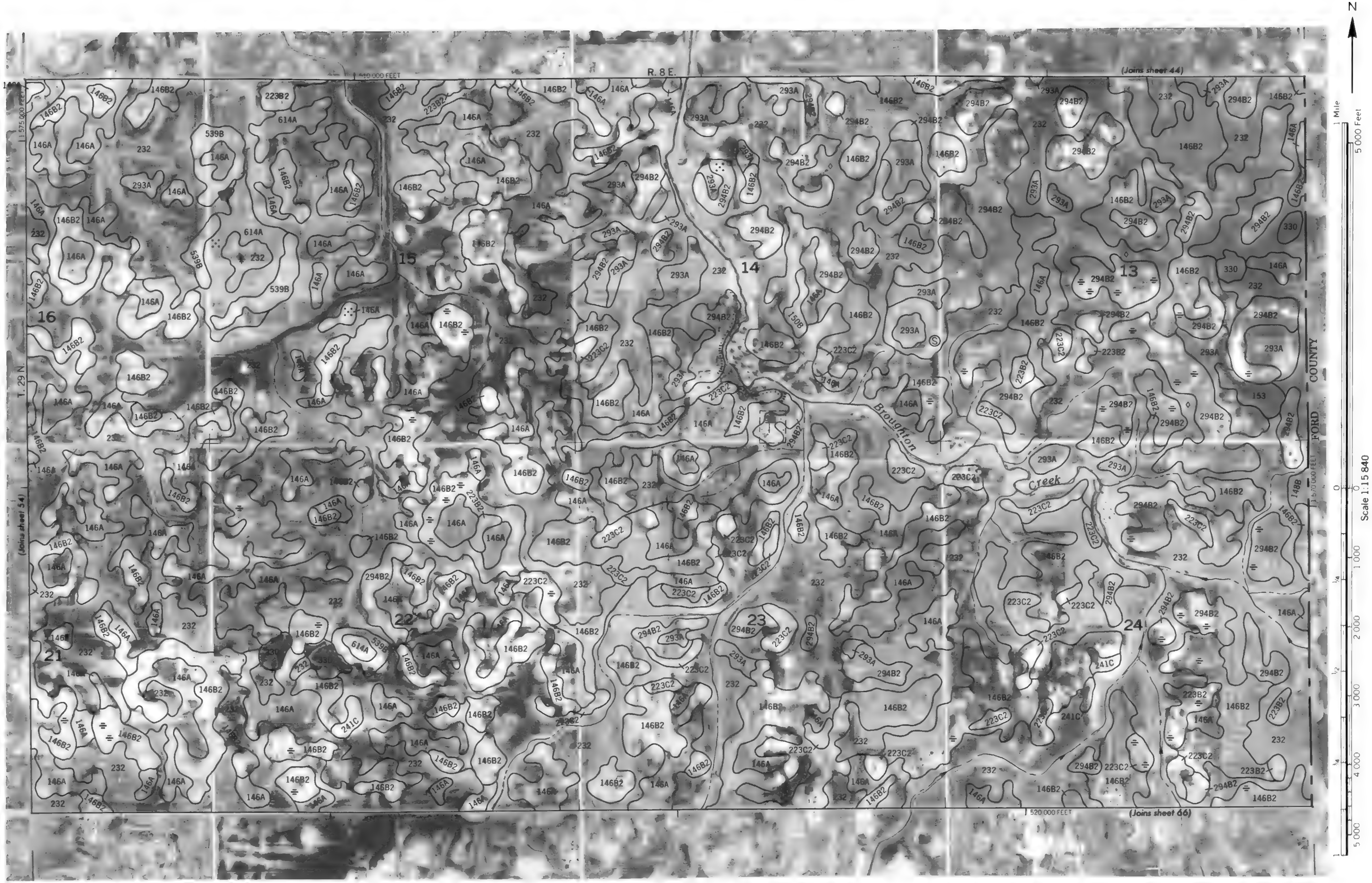
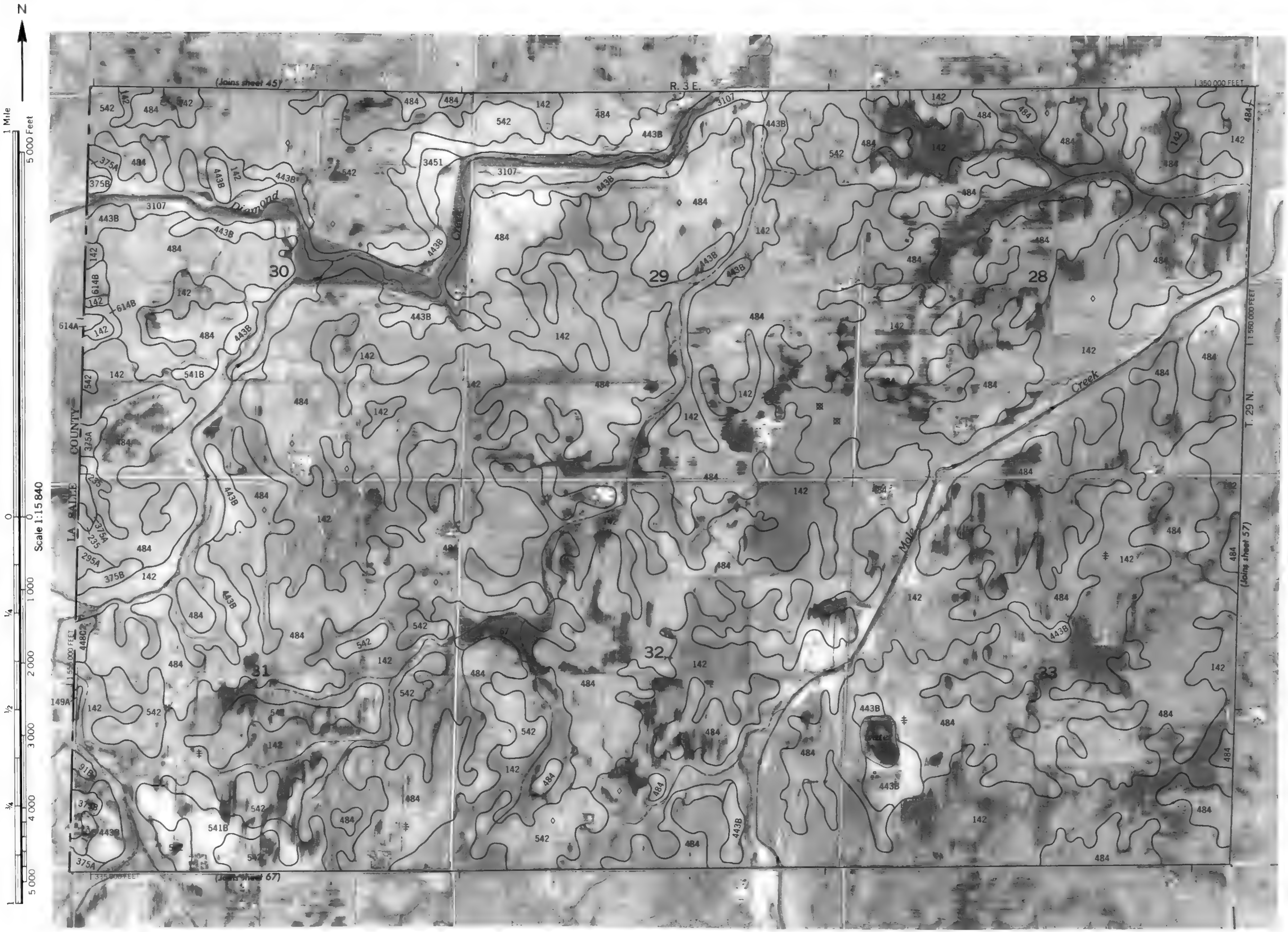
LIVINGSTON COUNTY, ILLINOIS NO. 55

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 56



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

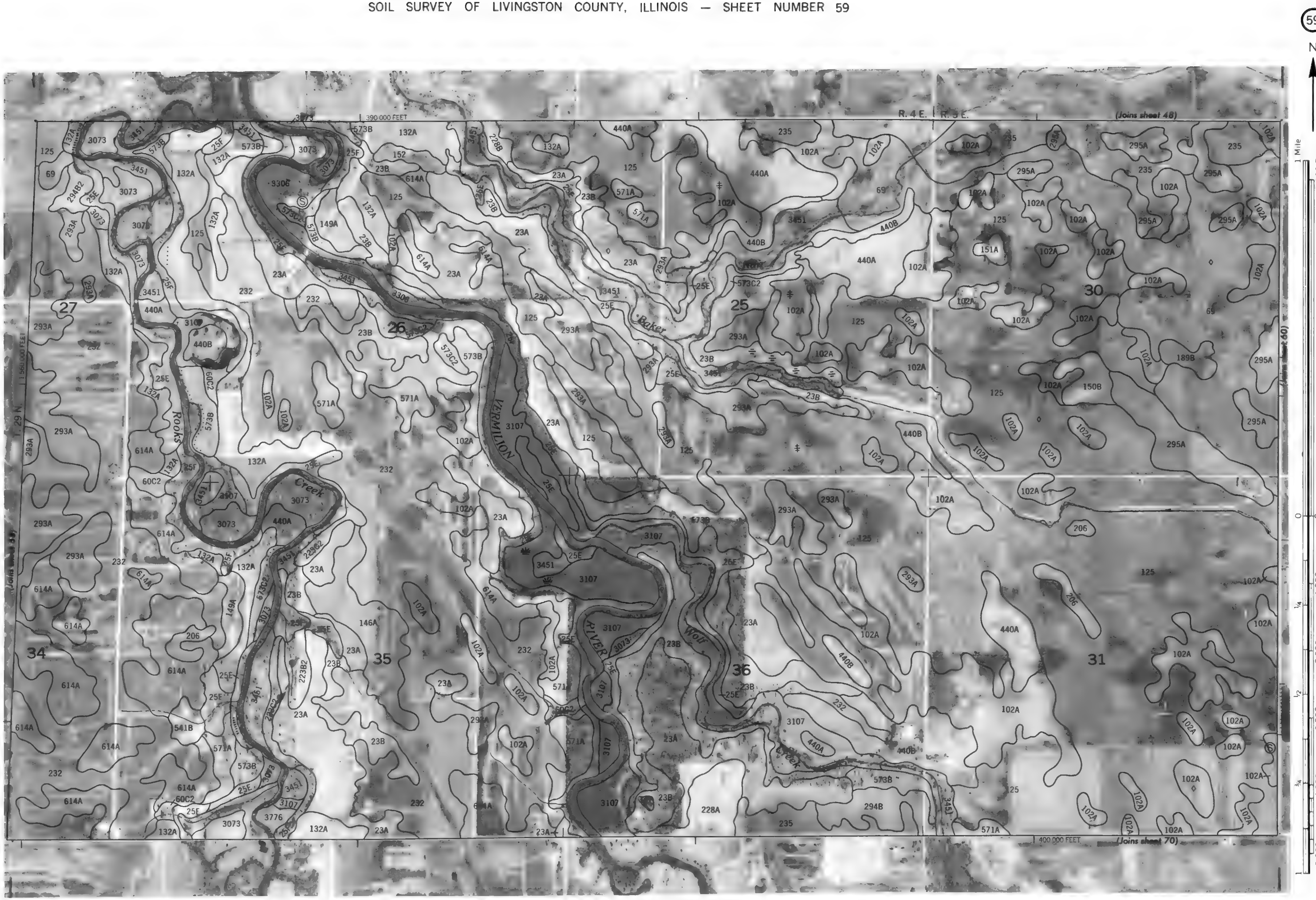
LIVINGSTON COUNTY, ILLINOIS NO. 57

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

58

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 58

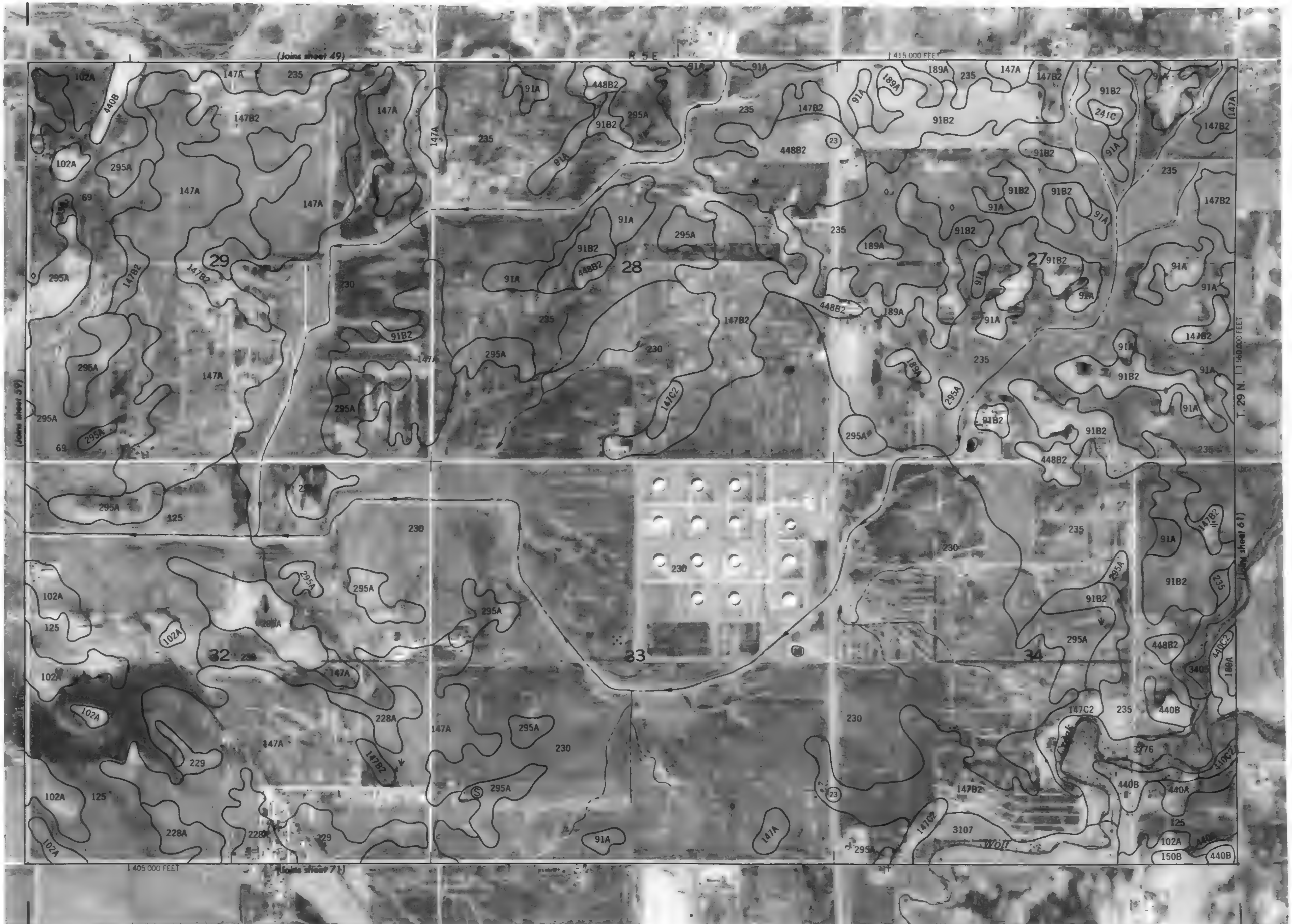


LIVINGSTON COUNTY, ILLINOIS NO. 59

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

60

N



1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
¼
2 000
½
3 000
¾
4 000
5 000
1

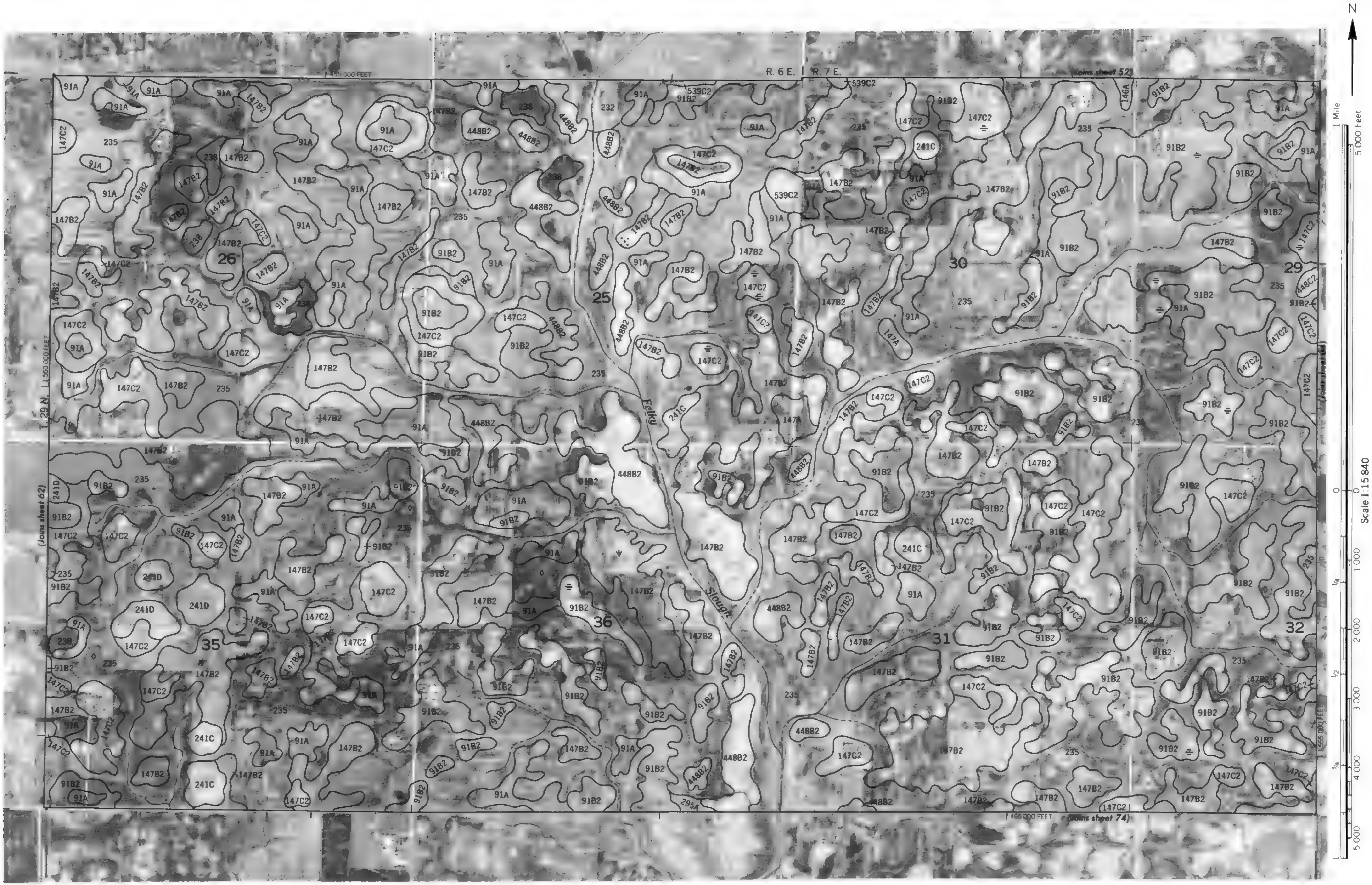
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 60

LIVINGSTON COUNTY, ILLINOIS NO. 61

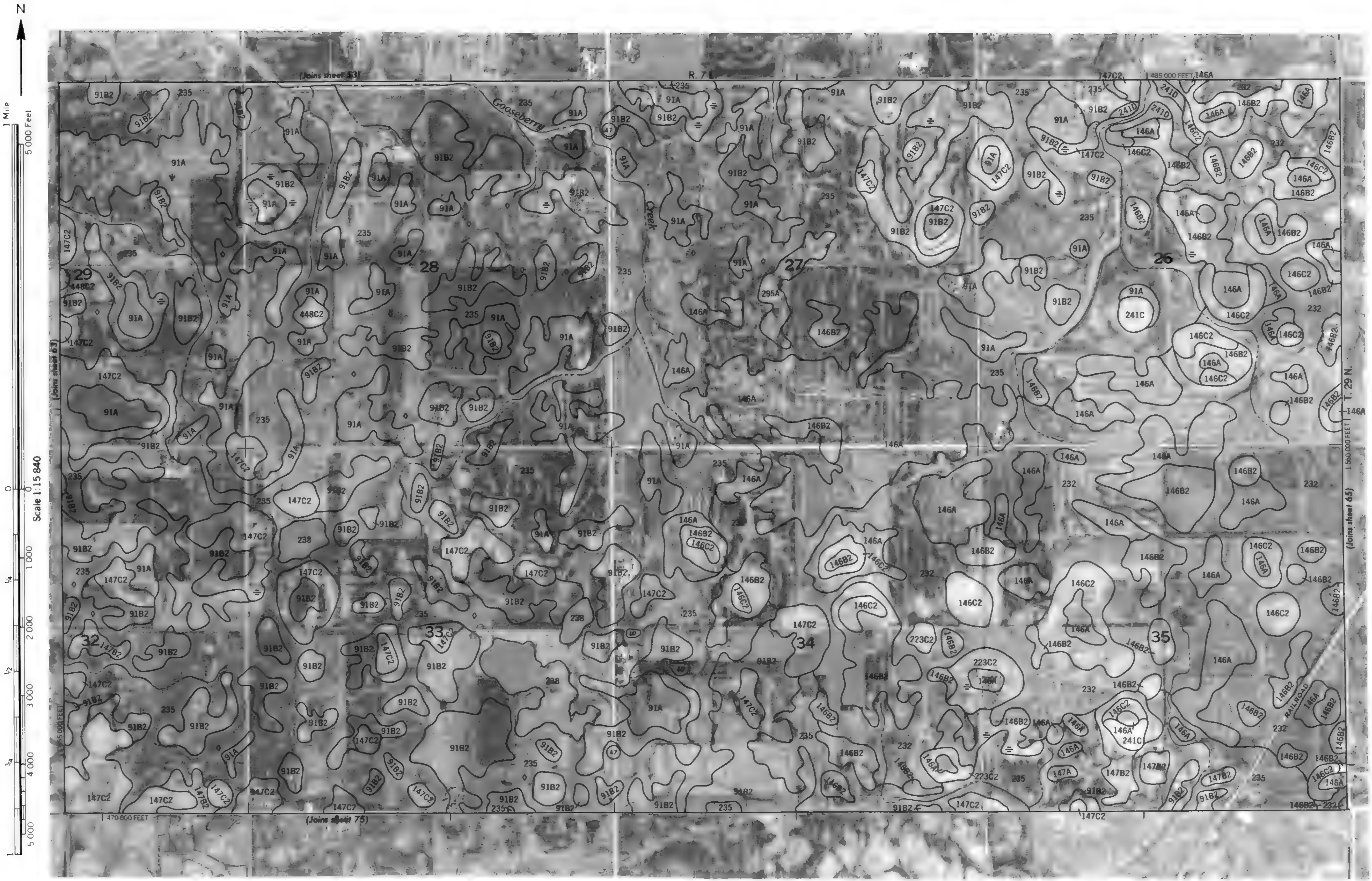
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

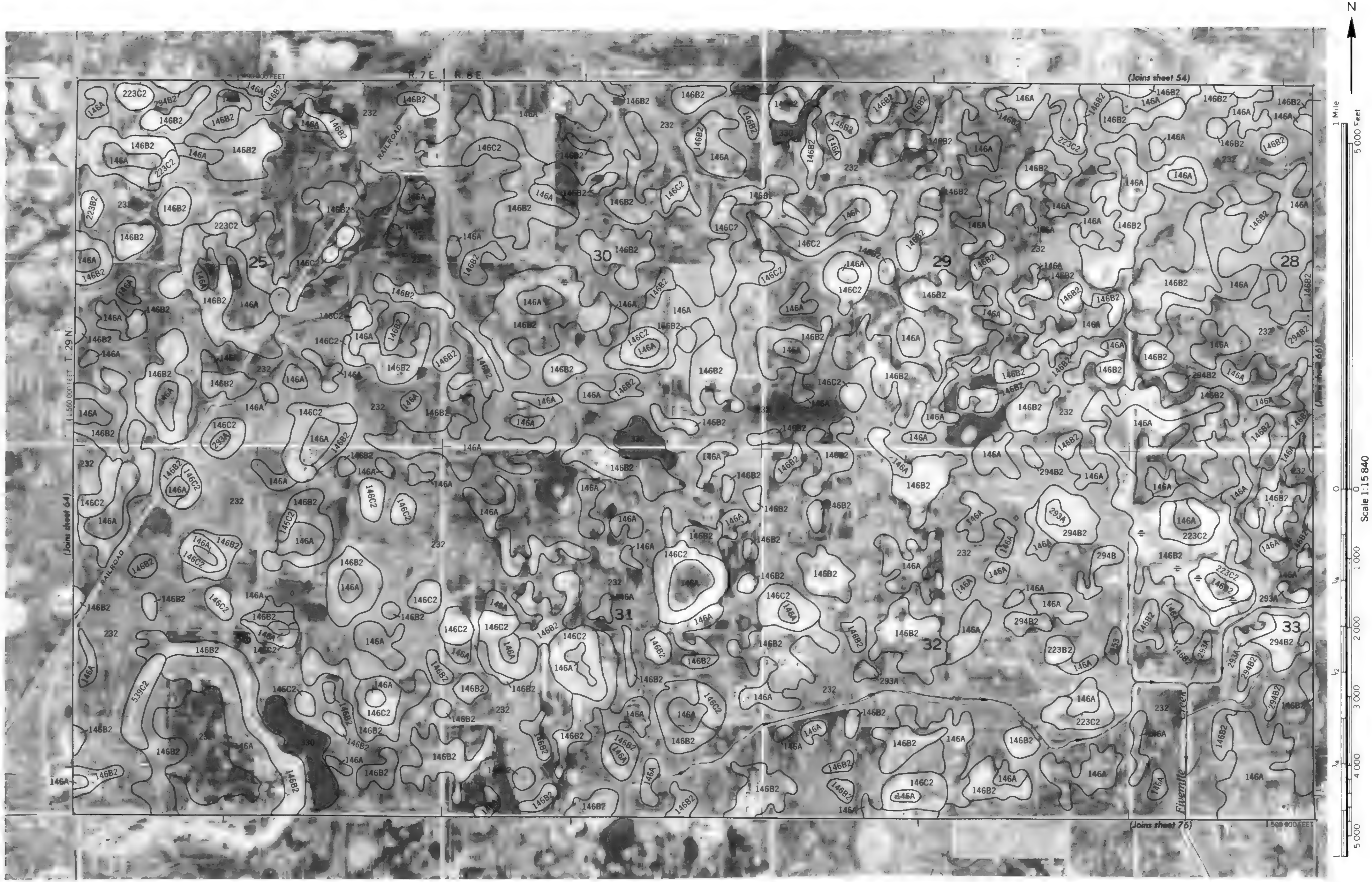


LIVINGSTON COUNTY, ILLINOIS NO. 63

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

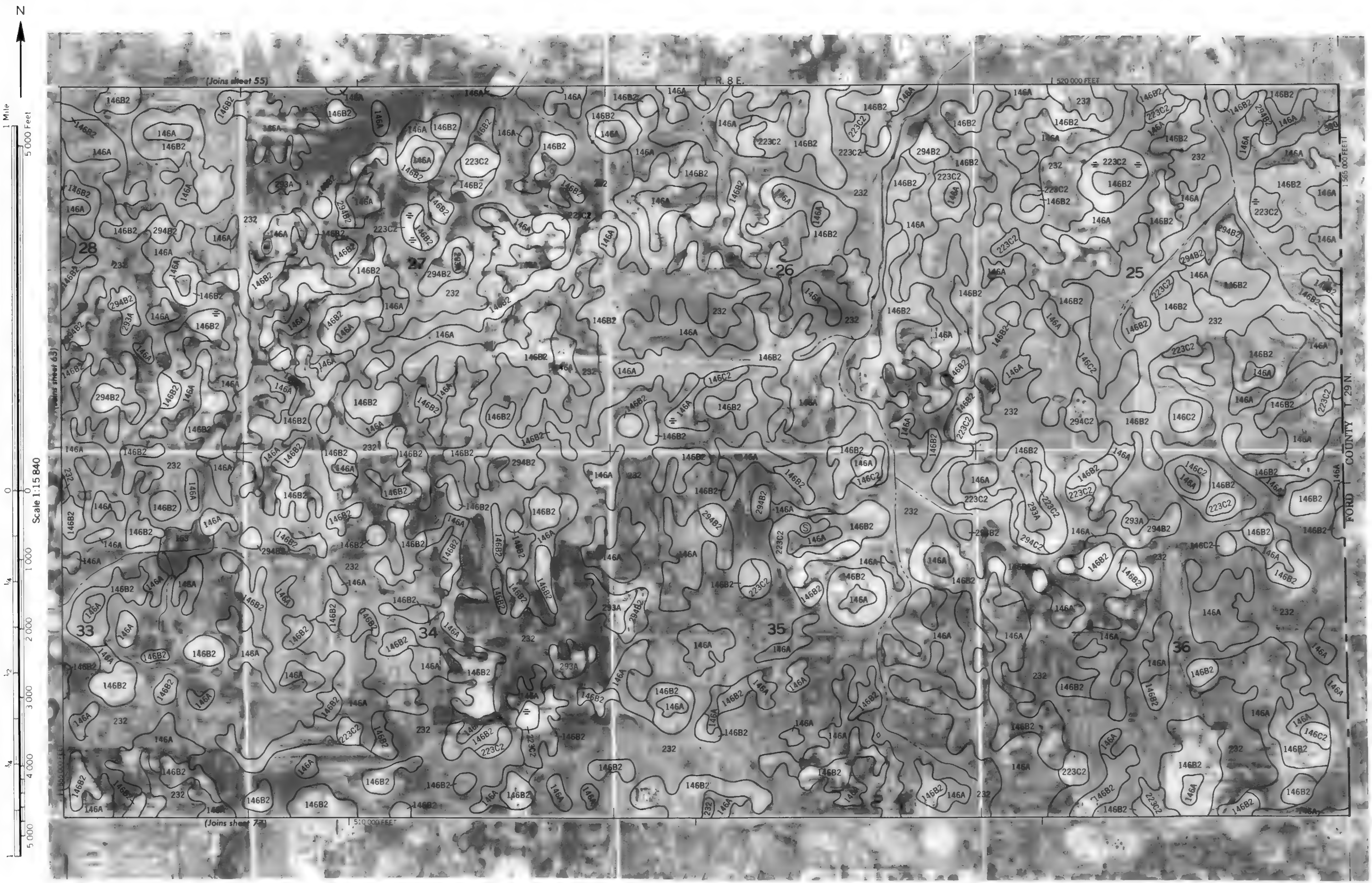


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



LIVINGSTON COUNTY, ILLINOIS NO. 65

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

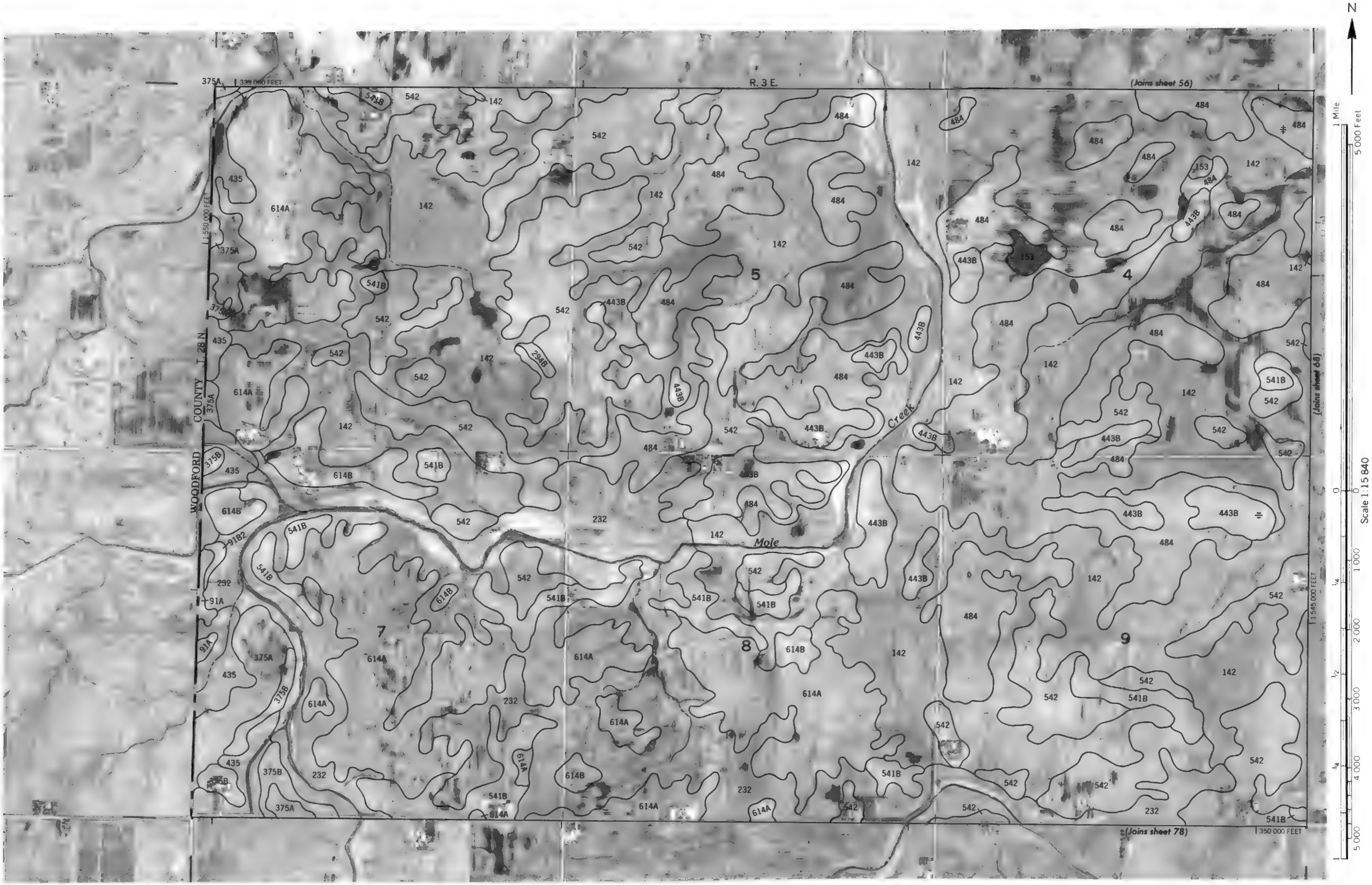


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

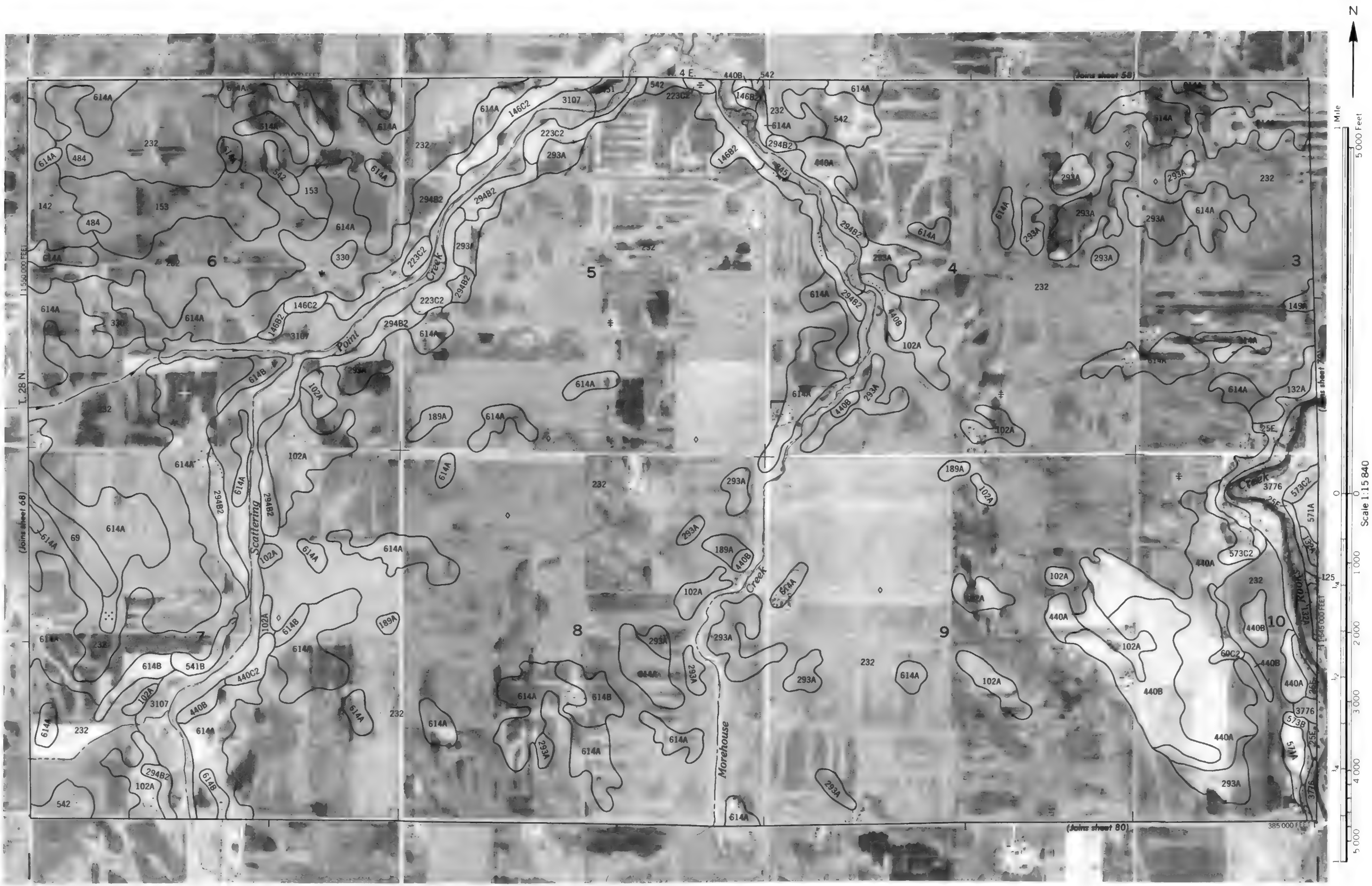
LIVINGSTON COUNTY, ILLINOIS NO. 66

LIVINGSTON COUNTY, ILLINOIS NO. 67

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

70

N

1 Mile

5 000 Feet

Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

71

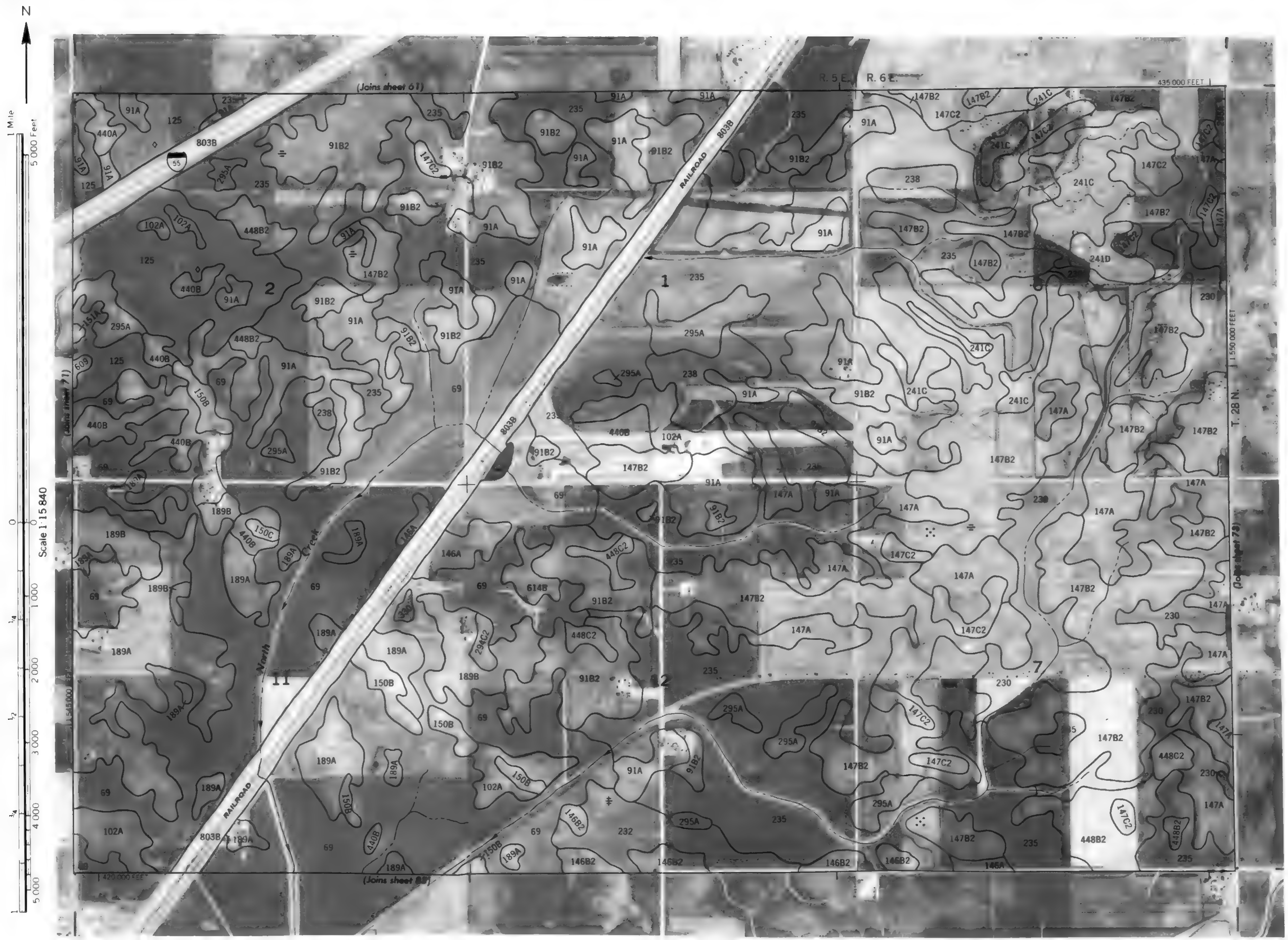
N

1 Mile
5 000 Feet
Scale 1:15 840

LIVINGSTON COUNTY, ILLINOIS NO. 71

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

72

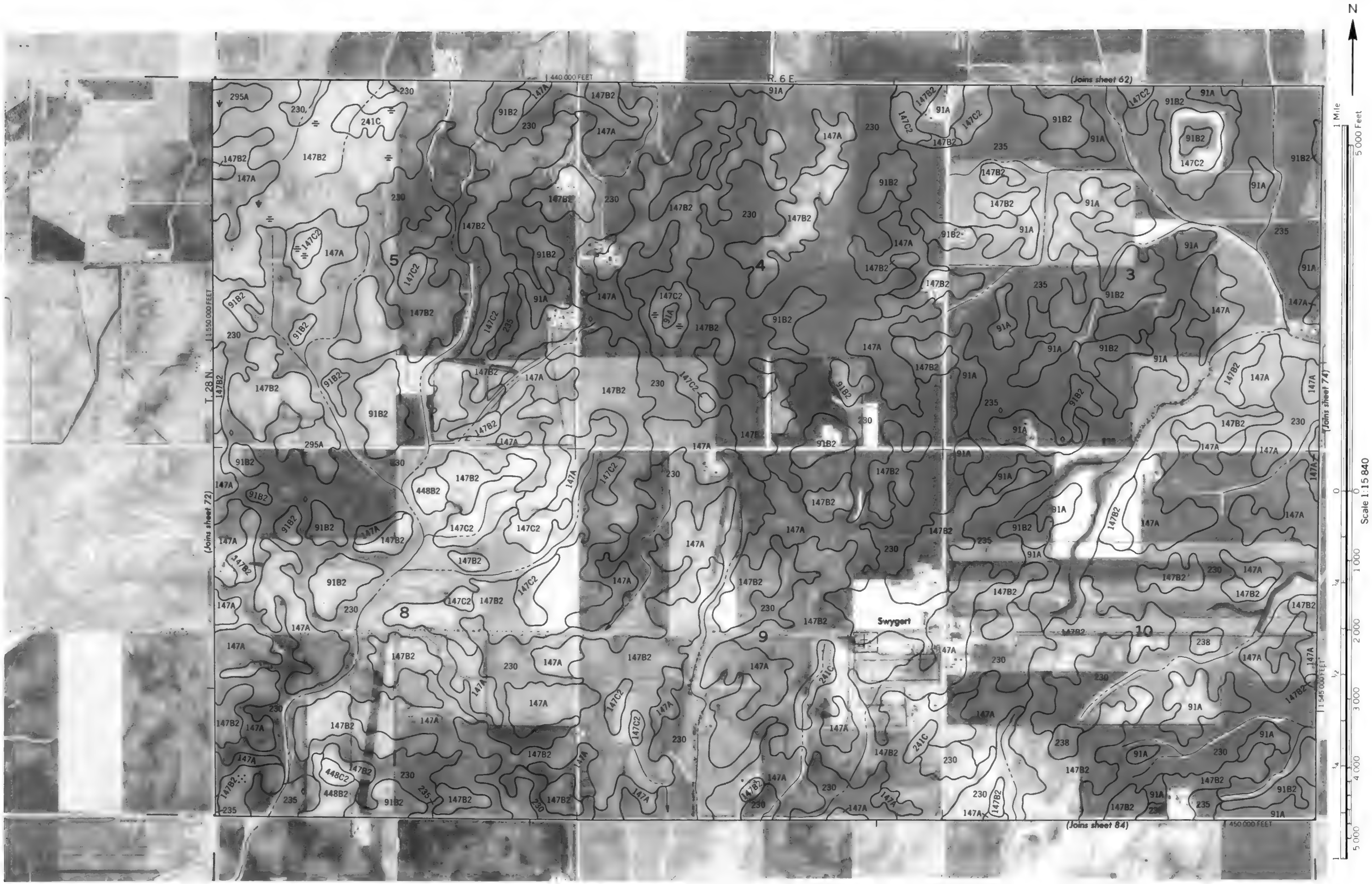


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

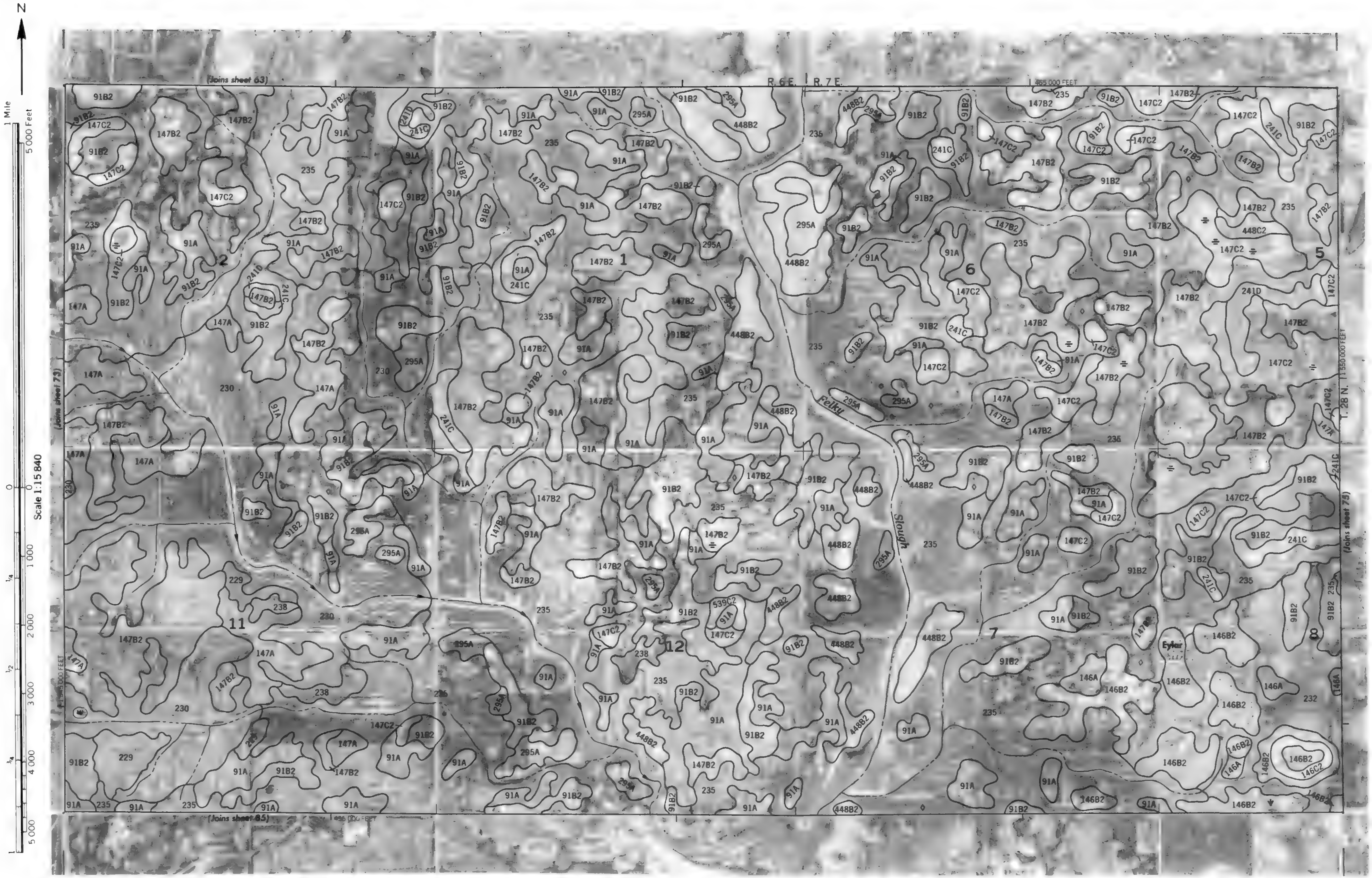
LIVINGSTON COUNTY, ILLINOIS NO. 72

LIVINGSTON COUNTY, ILLINOIS NO. 73

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



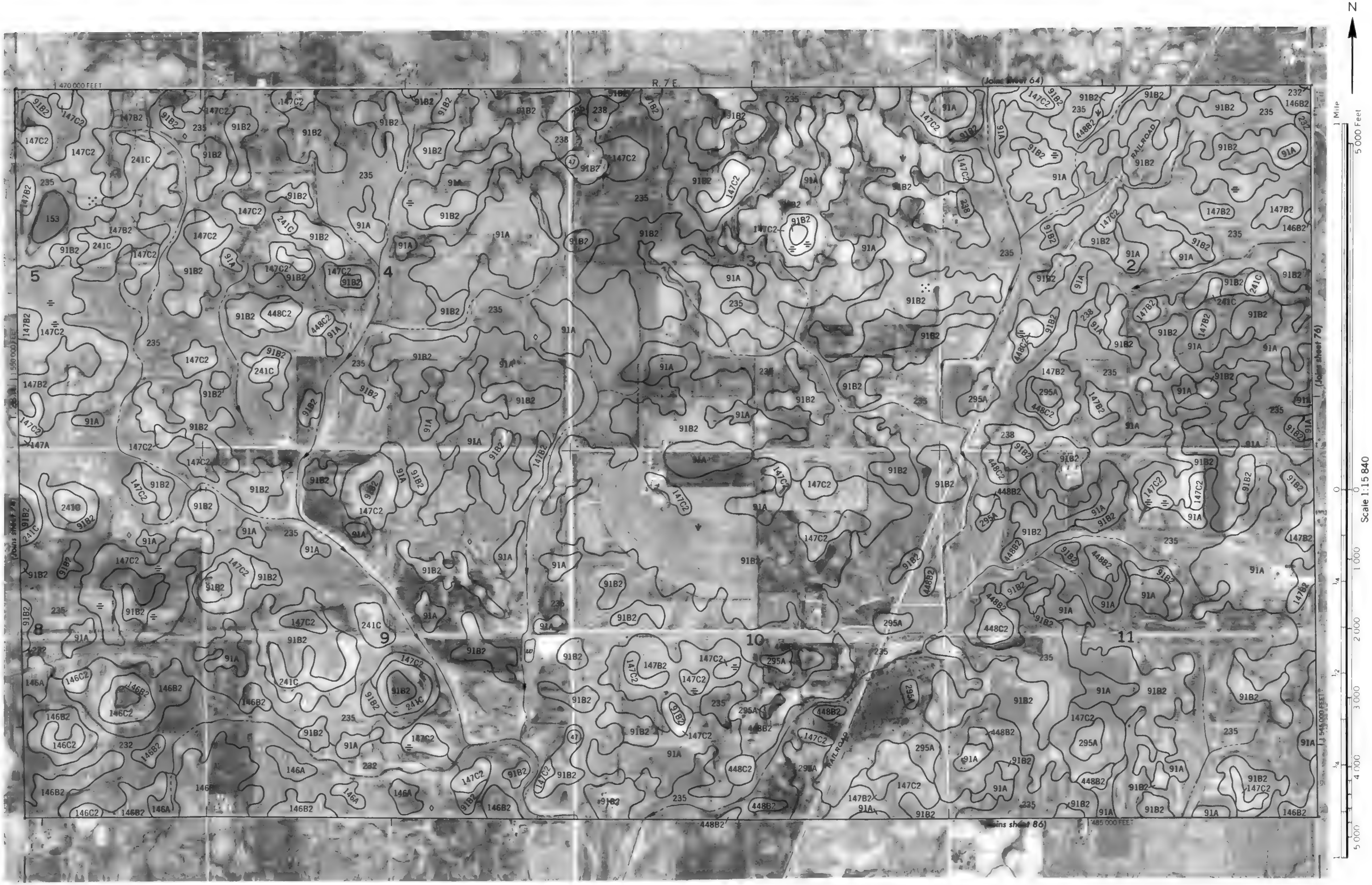
SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 74

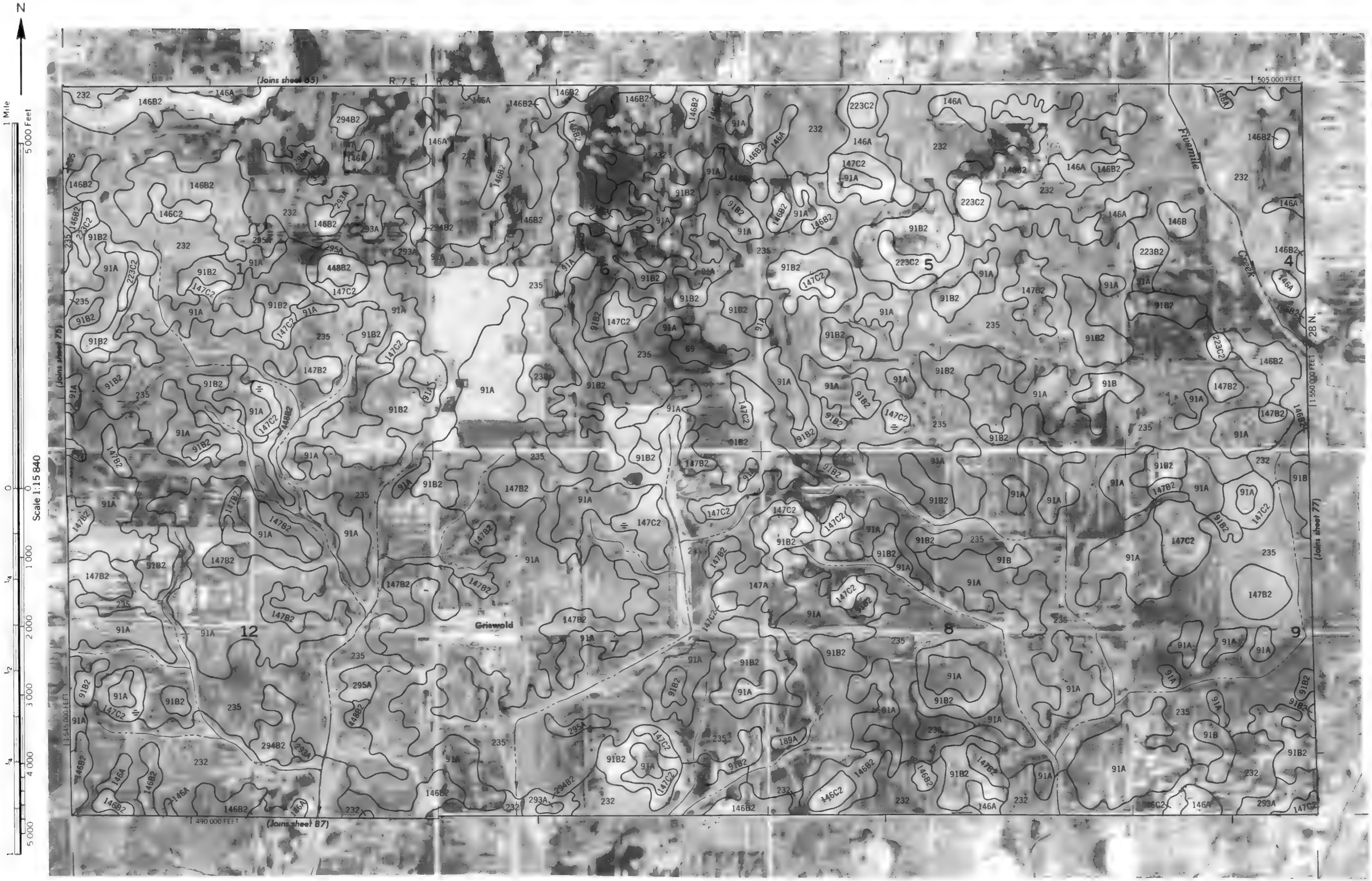


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

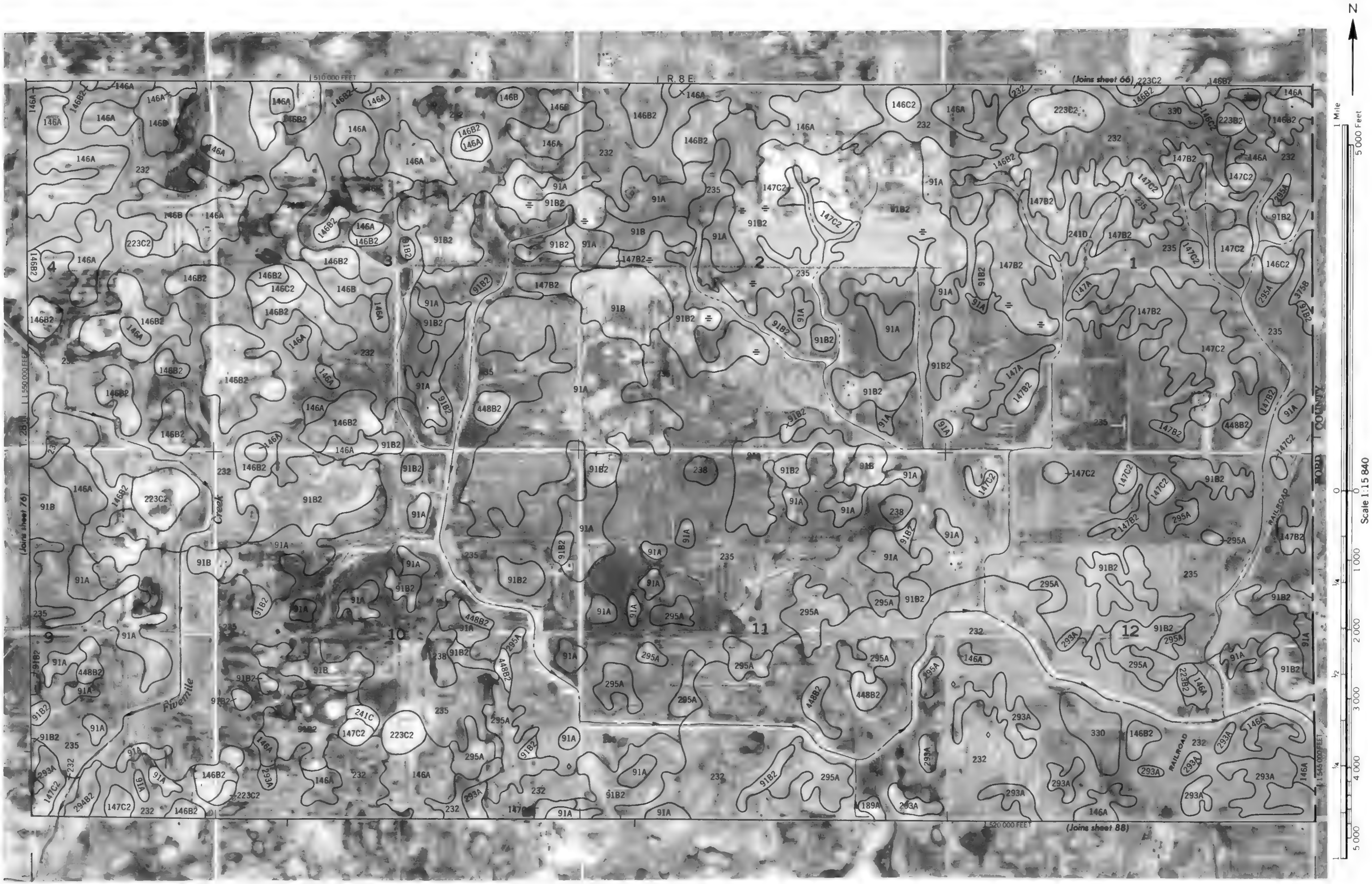
LIVINGSTON COUNTY, ILLINOIS NO. 75

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



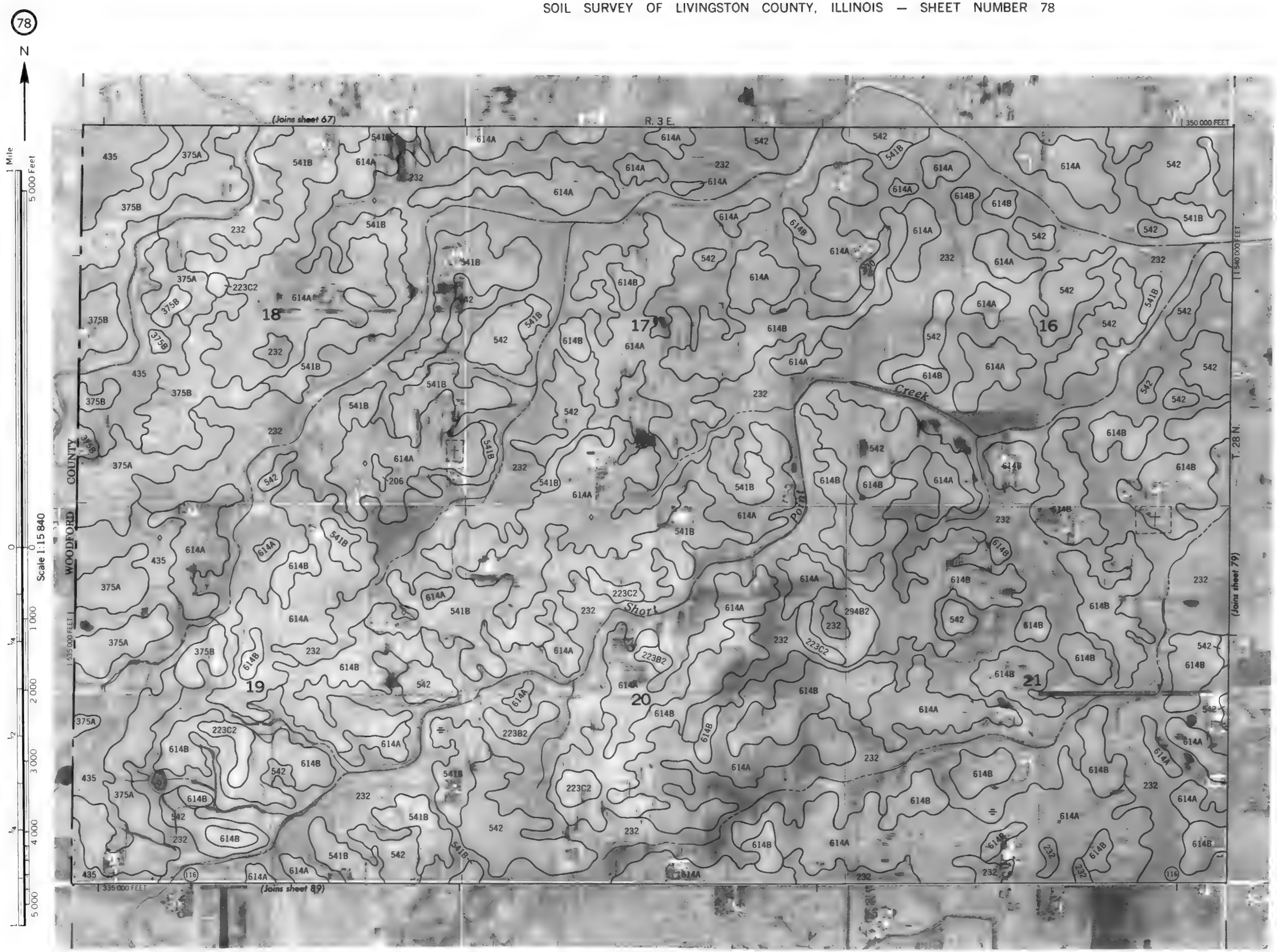


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



LIVINGSTON COUNTY, ILLINOIS NO. 77

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

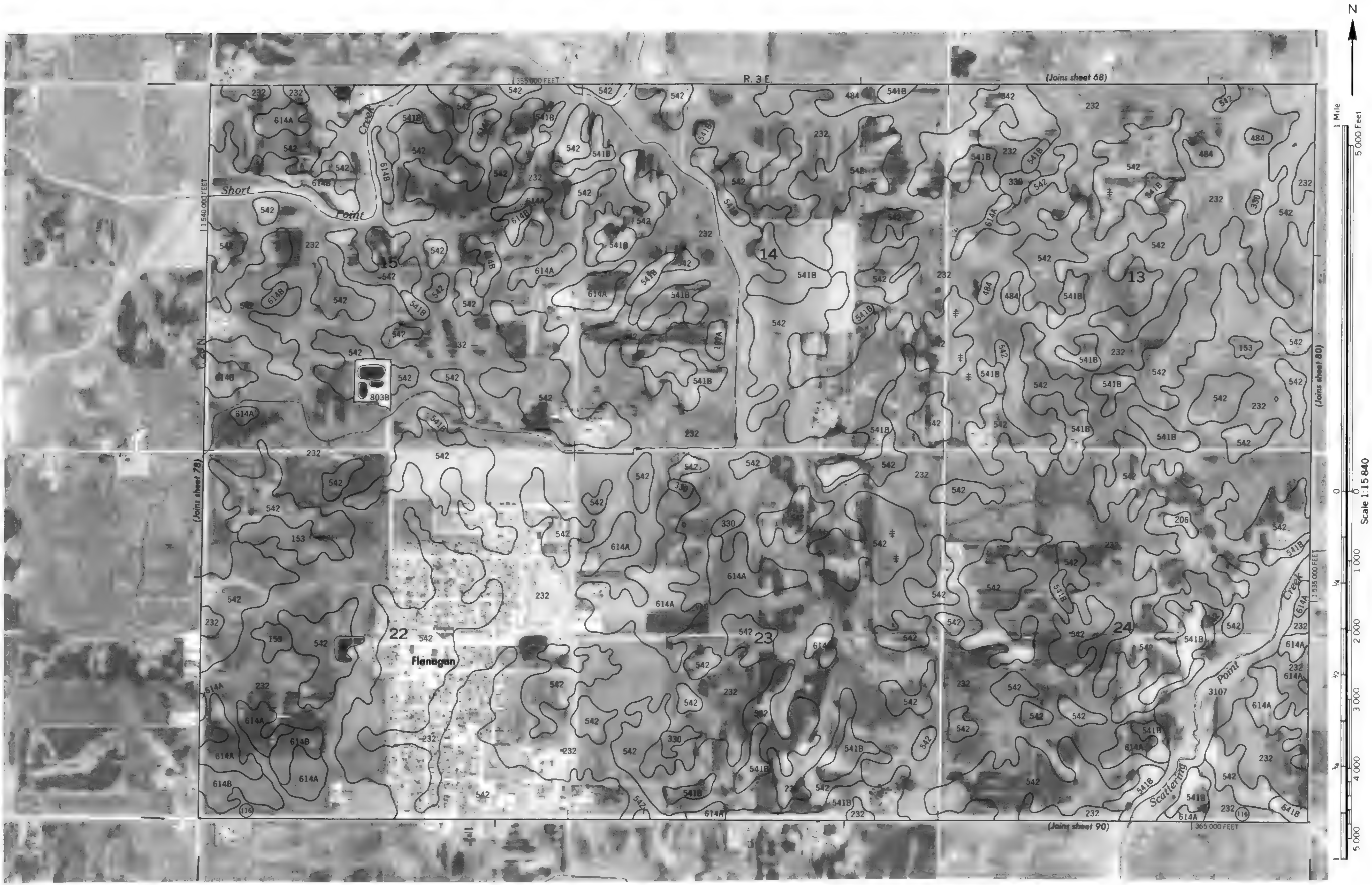


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 78

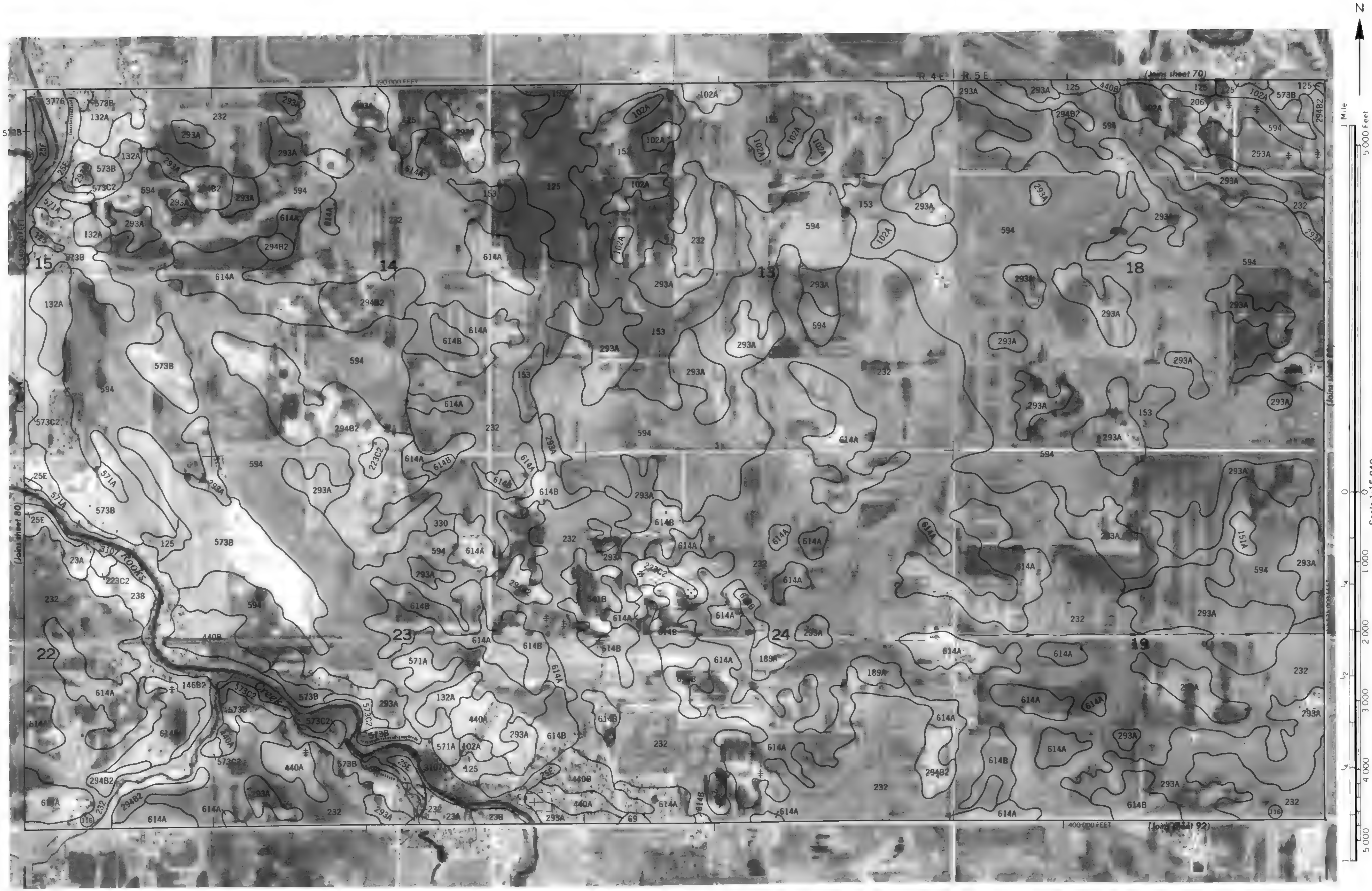
LIVINGSTON COUNTY, ILLINOIS NO. 79

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 80



LIVINGSTON COUNTY, ILLINOIS NO. 81

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

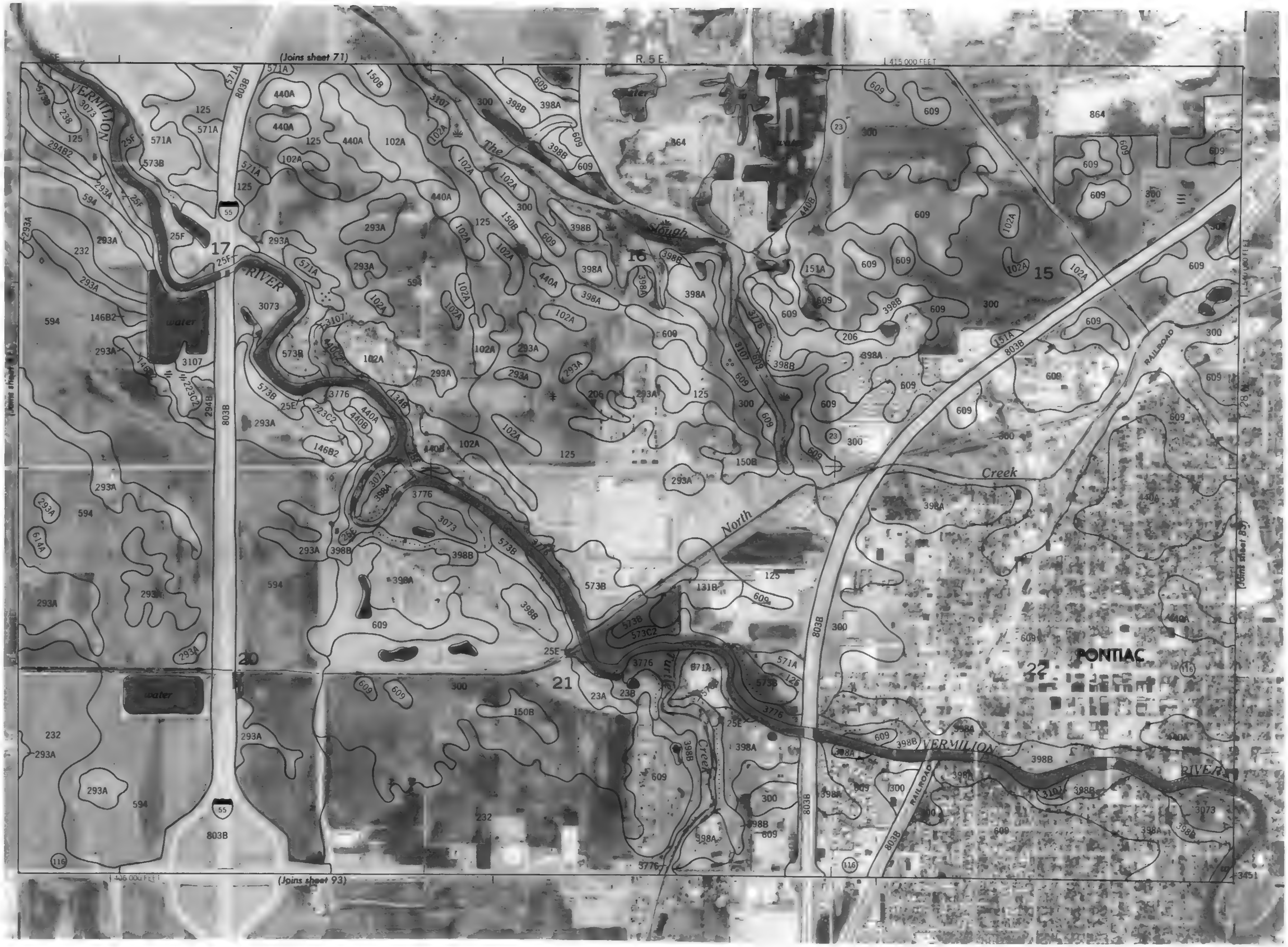
SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 82

N

1 Mile

5 000 Feet

Scale 1:15 840



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 82

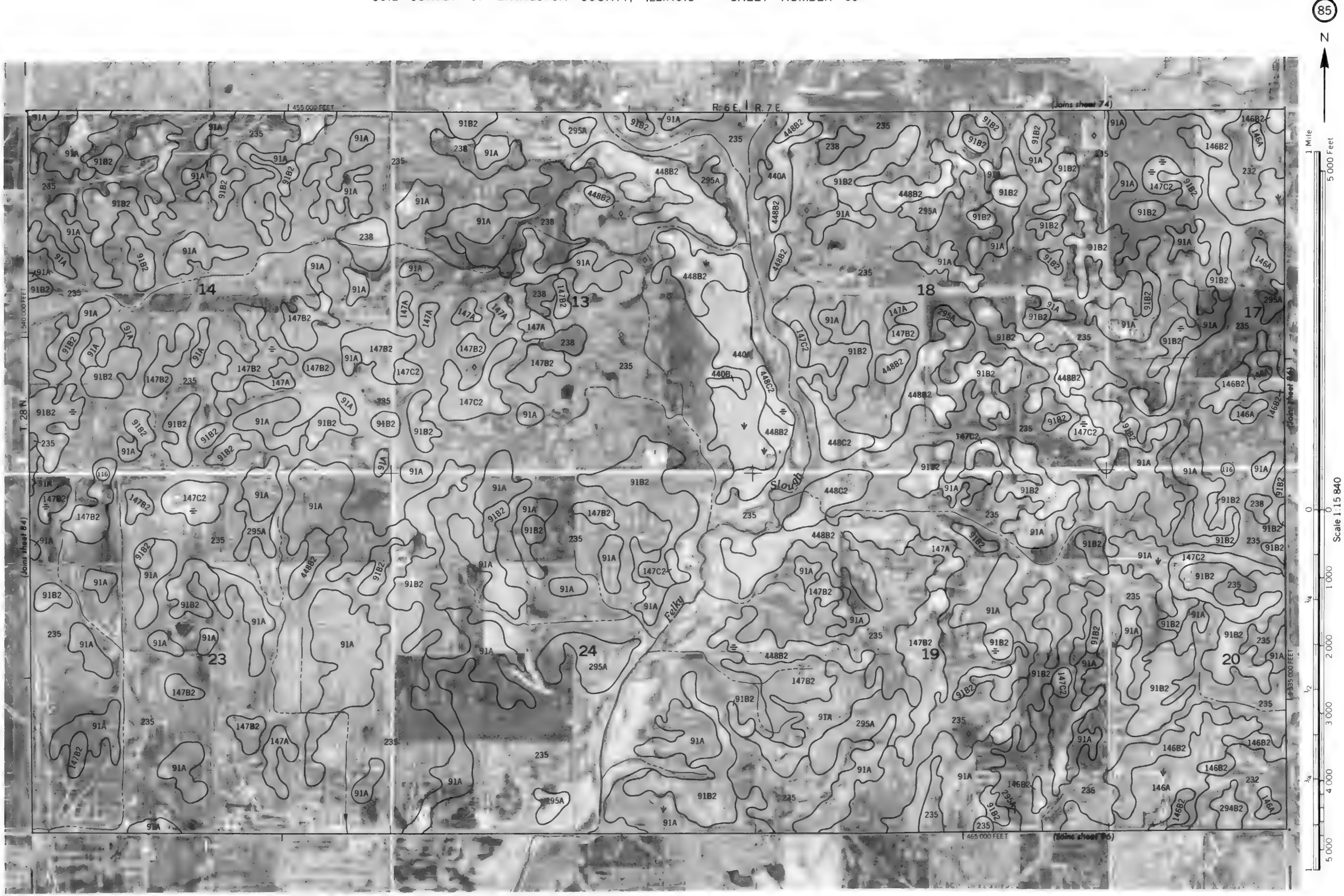
LIVINGSTON COUNTY, ILLINOIS NO. 83

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

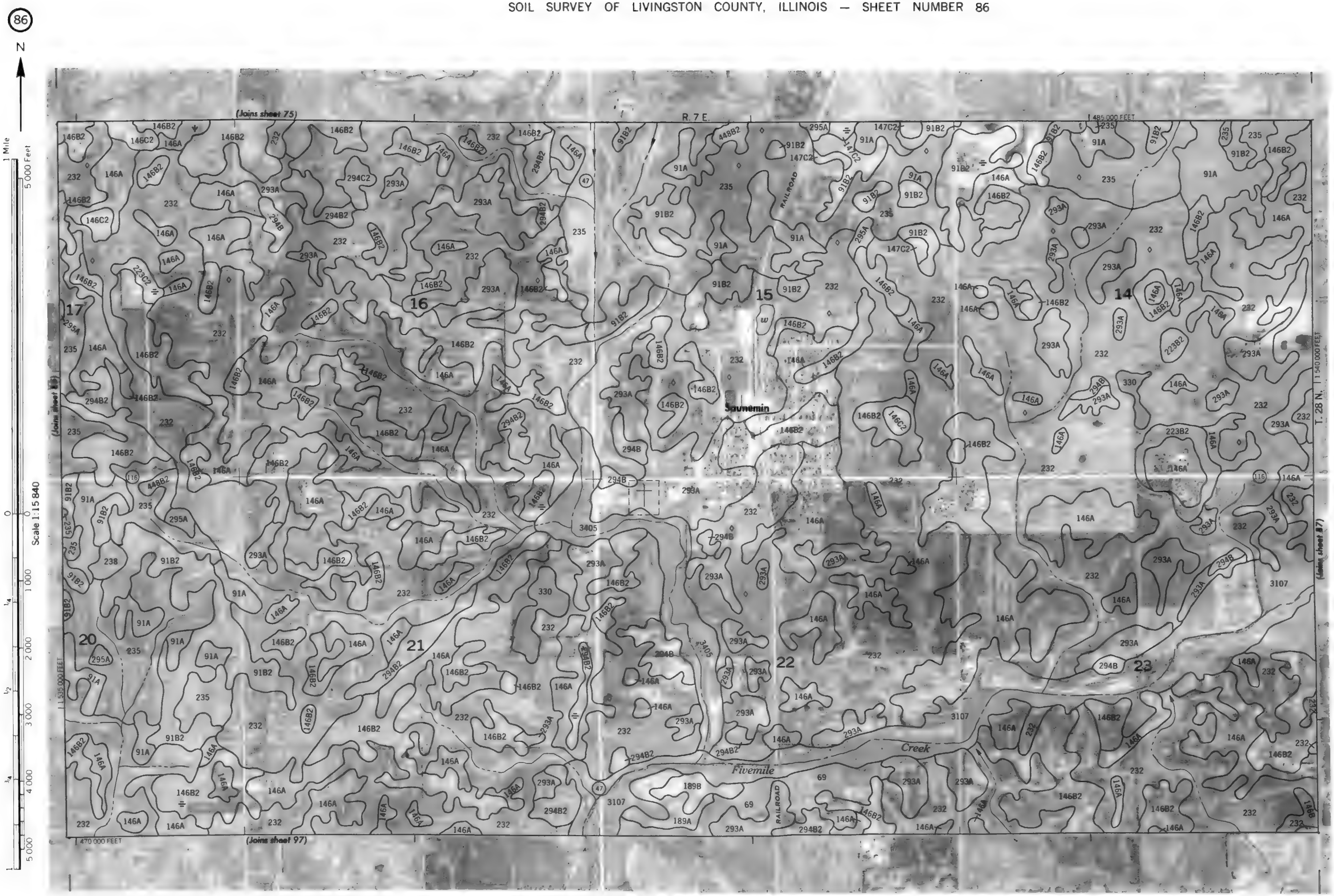
1 Mile
5 000 Feet
Scale 1:15 840
0 1 000 2 000 3 000 4 000 5 000
¼ ½ ¾ 1

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



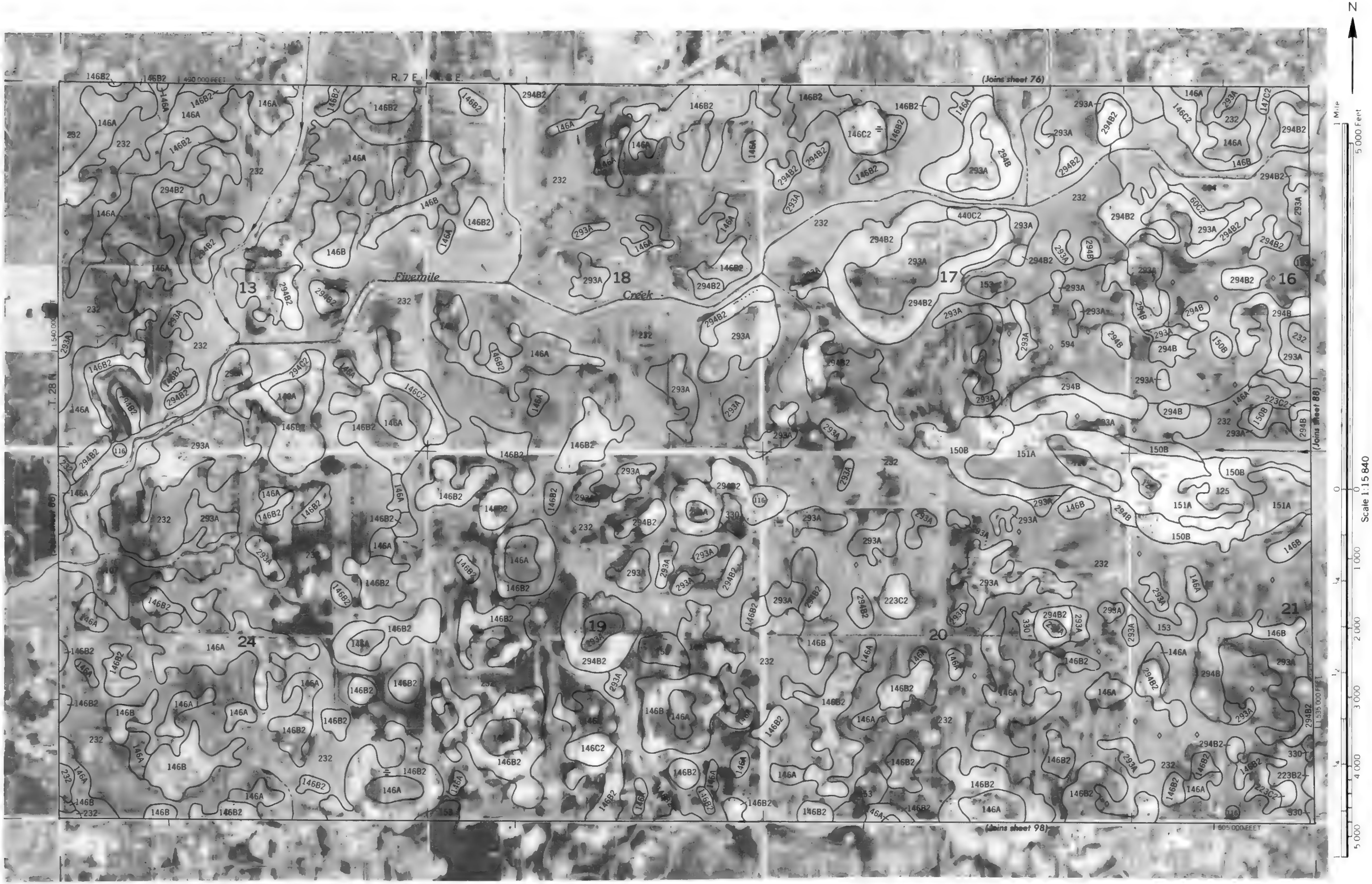
LIVINGSTON COUNTY, ILLINOIS NO. 85

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

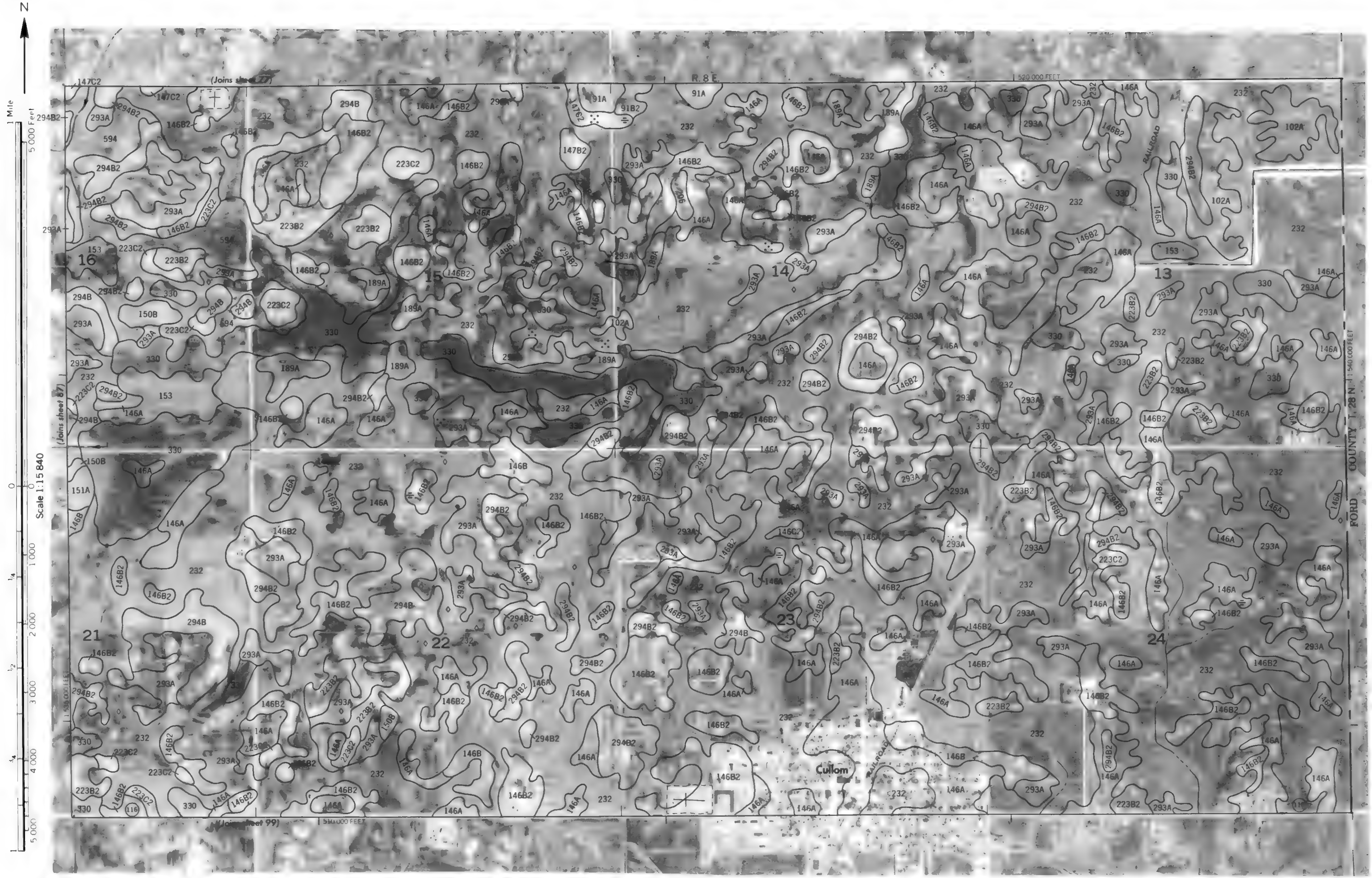
LIVINGSTON COUNTY, ILLINOIS NO. 86



LIVINGSTON COUNTY, ILLINOIS NO. 87

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

88



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983–1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 88

89

LIVINGSTON COUNTY, ILLINOIS NO. 89

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

90

N

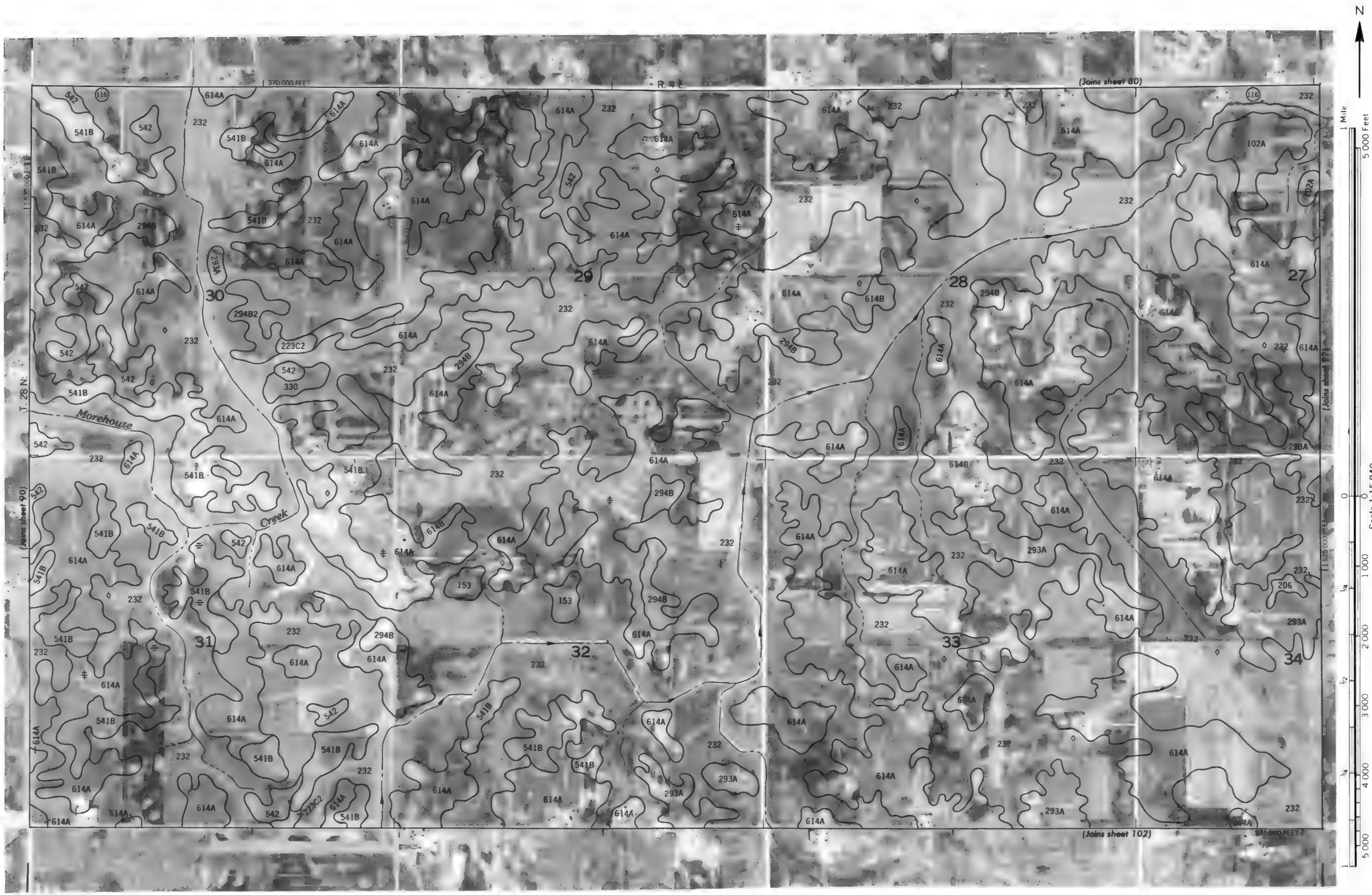
1 Mile
5 000 Feet
Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 90

LIVINGSTON COUNTY, ILLINOIS NO. 91

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



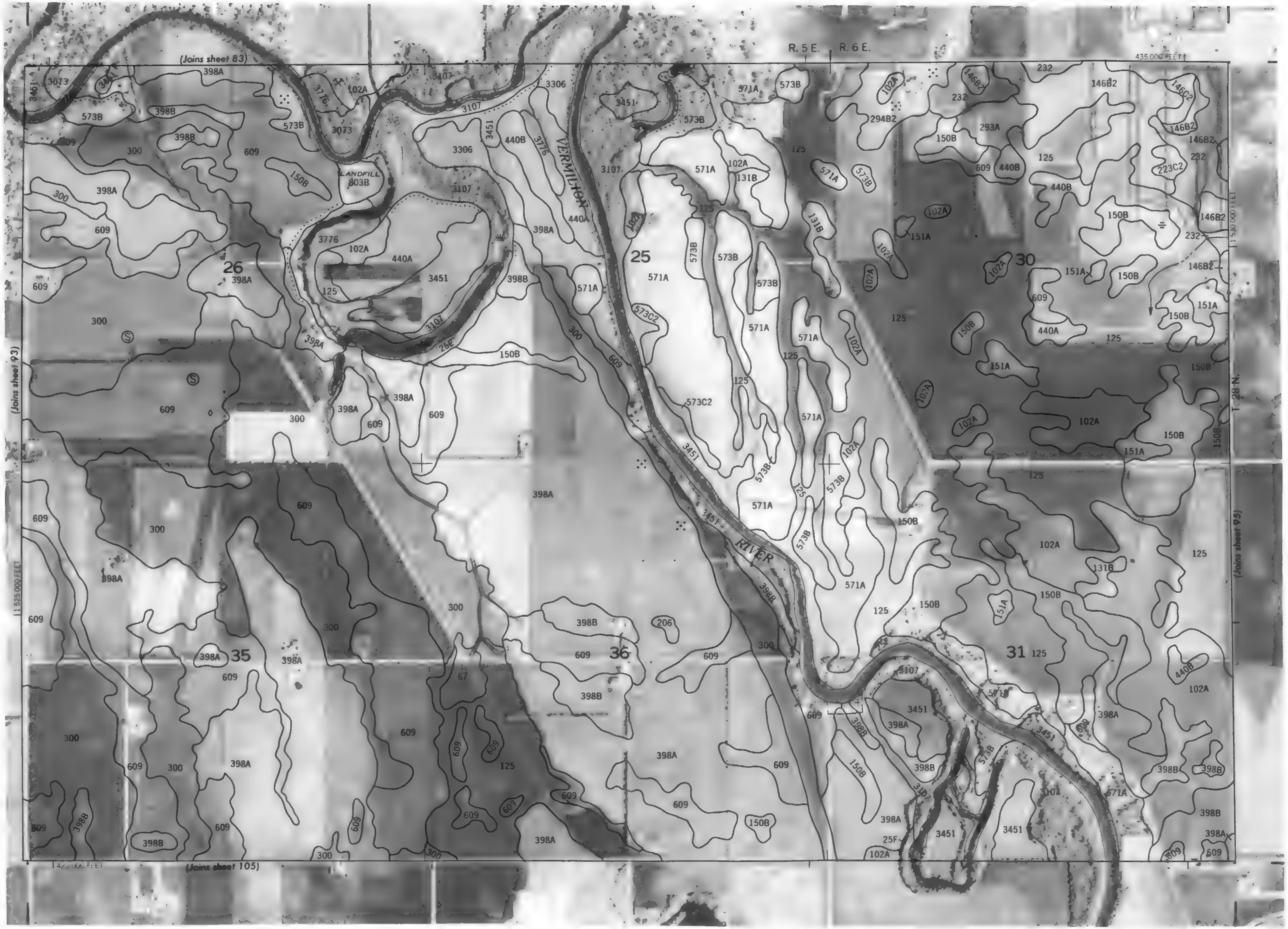
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 93

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 94

N



Scale 1:15 840

1 Mile

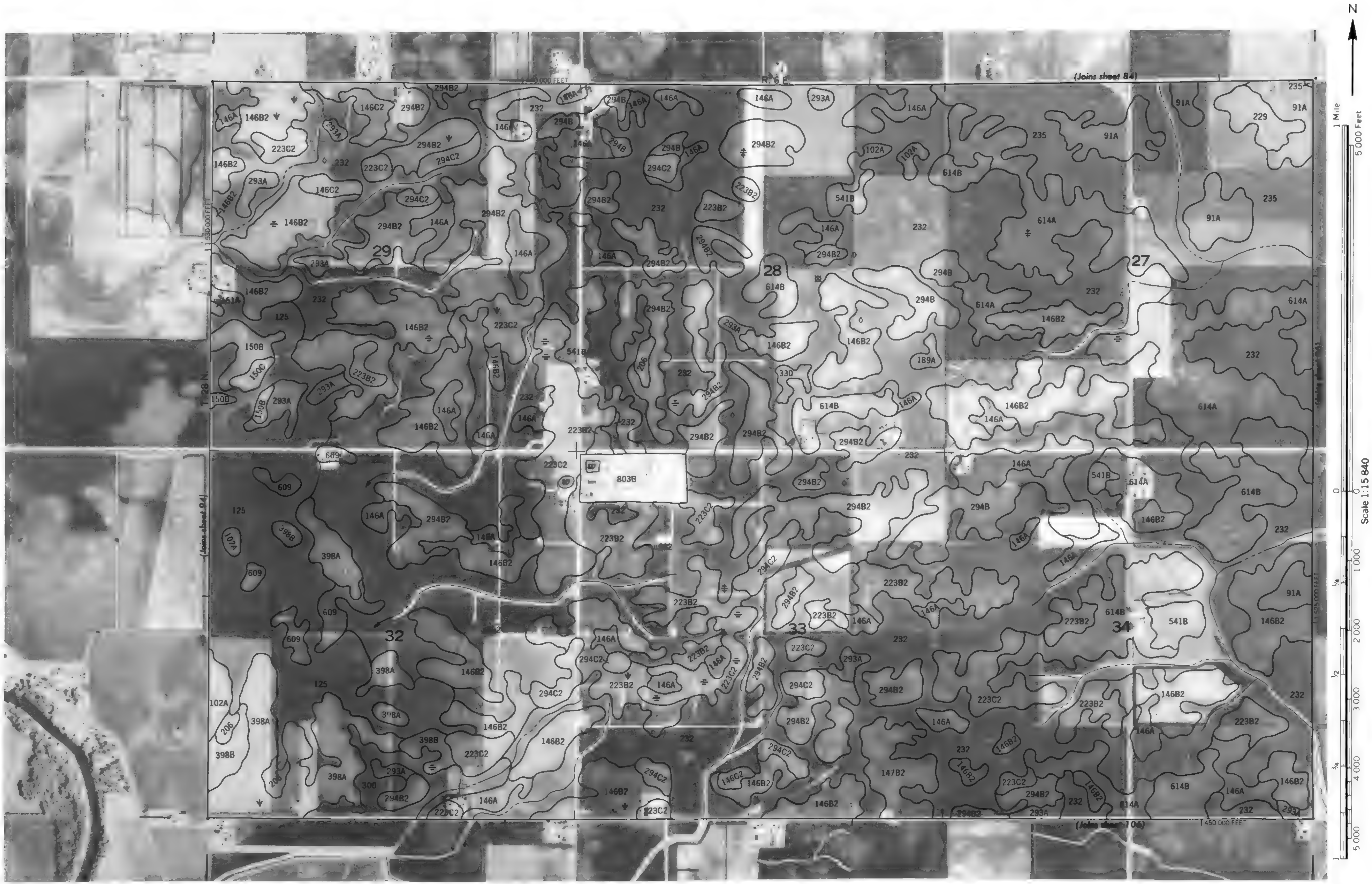
5 000 Feet

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned

LIVINGSTON COUNTY, ILLINOIS NO. 94

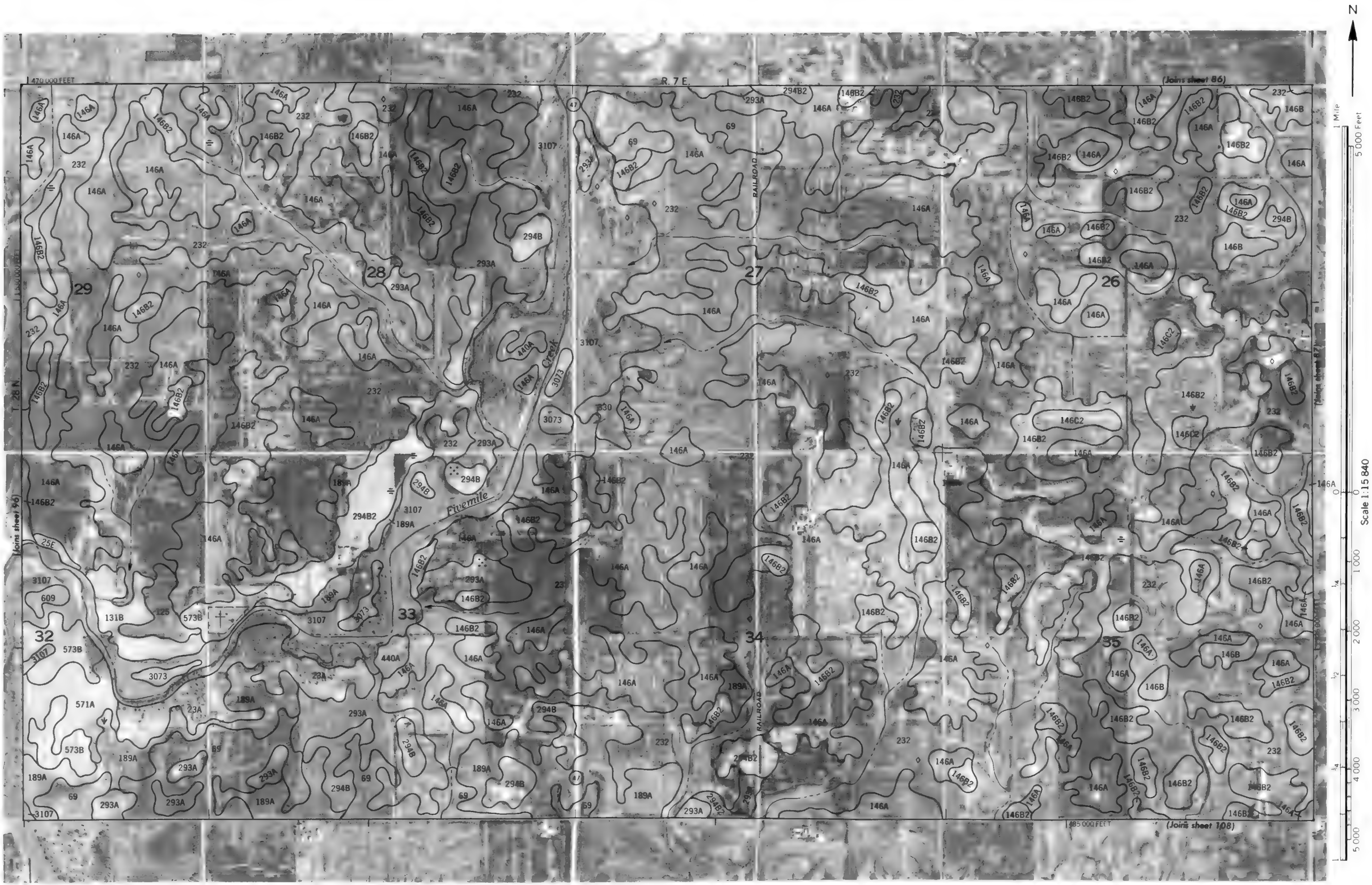
LIVINGSTON COUNTY, ILLINOIS NO. 95

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



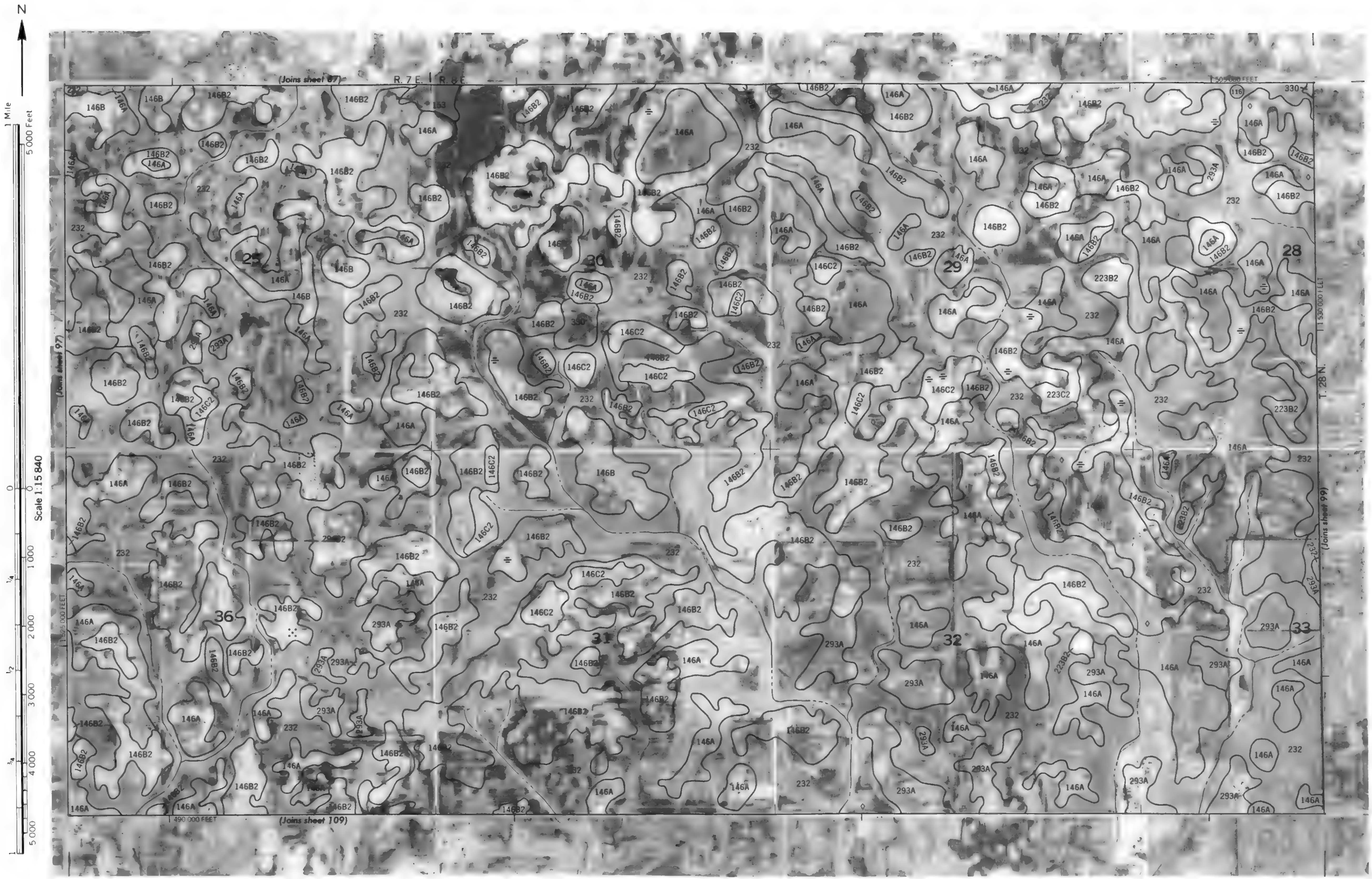
96

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



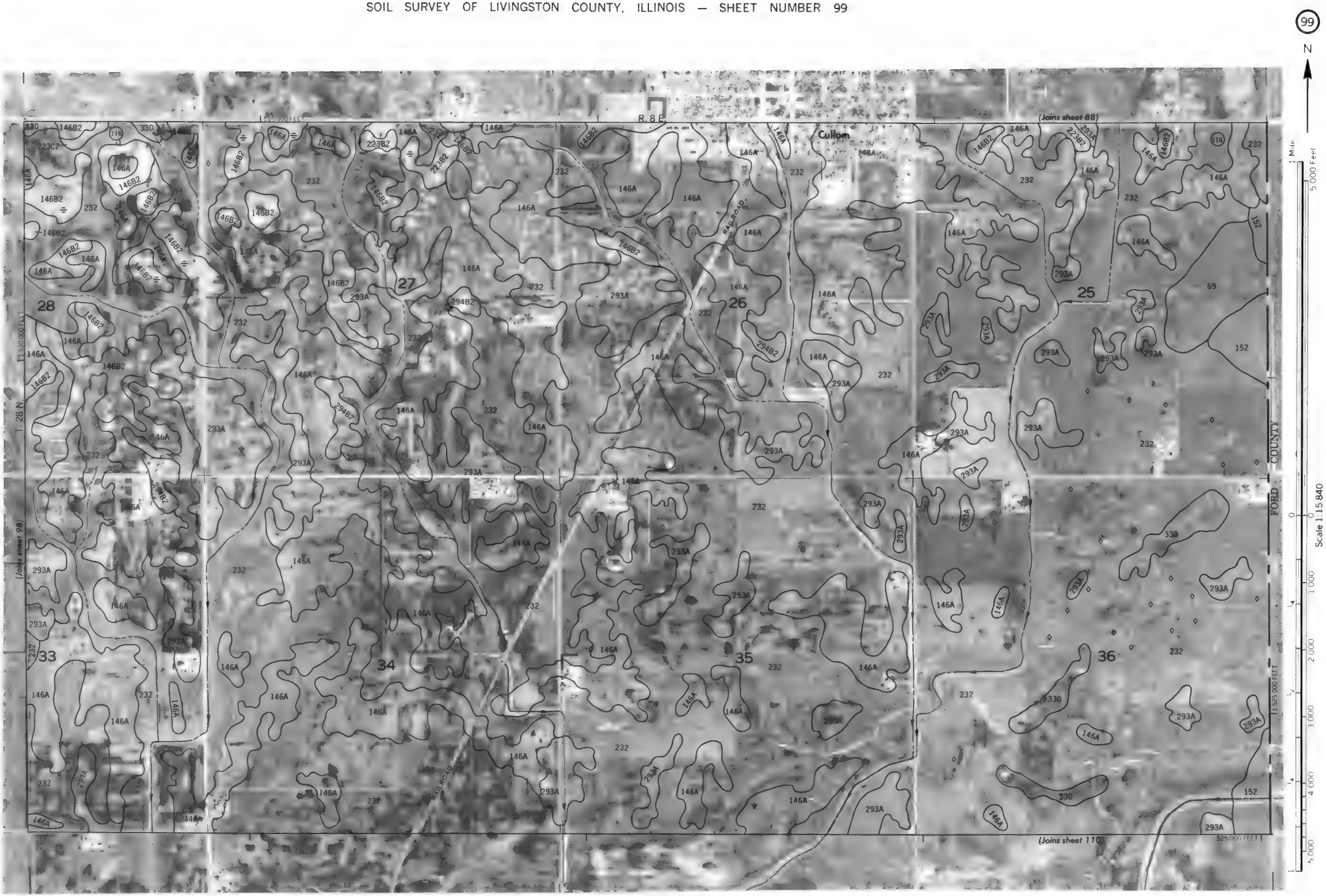
LIVINGSTON COUNTY, ILLINOIS NO. 97

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



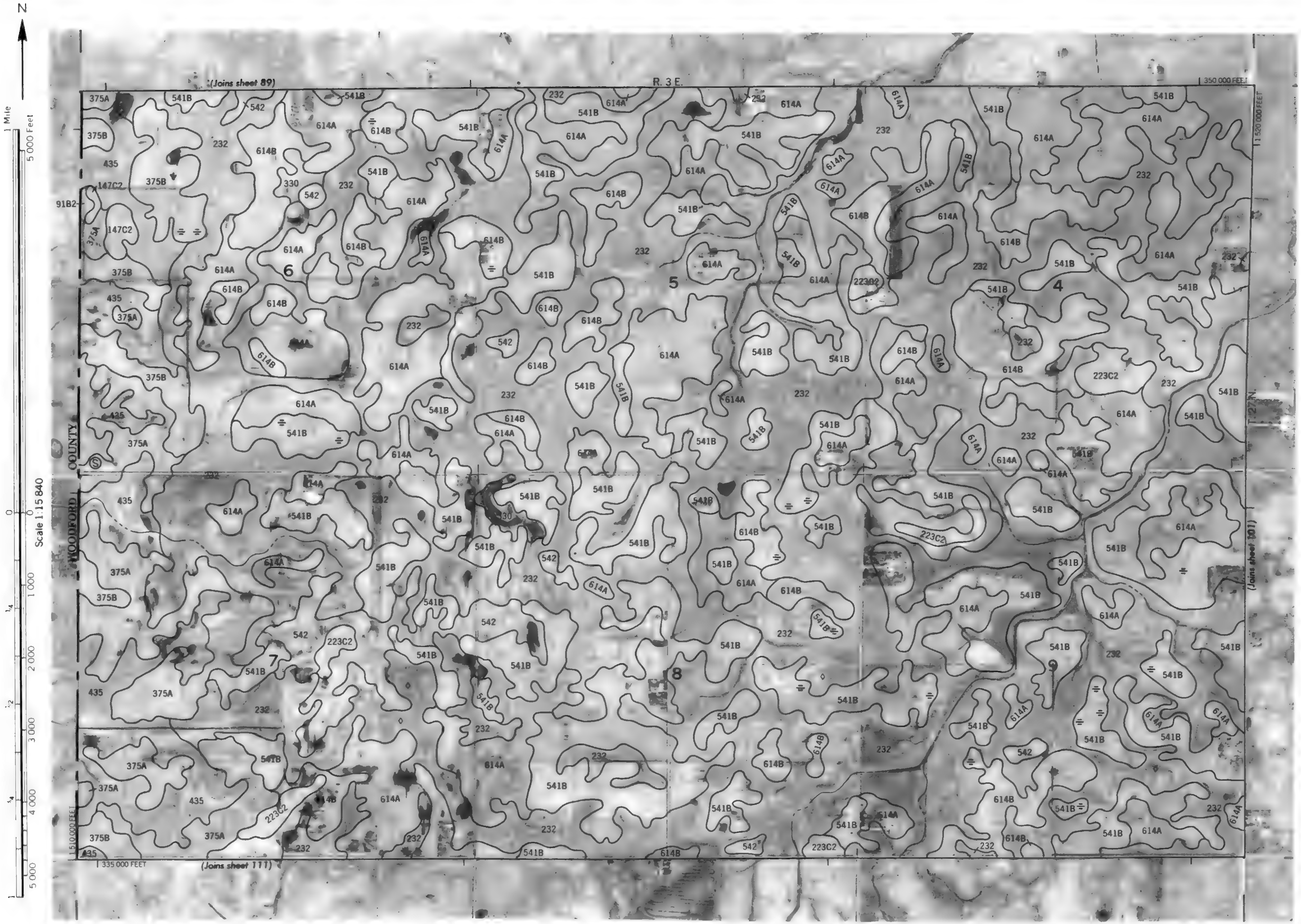
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned

LIVINGSTON COUNTY, ILLINOIS NO. 98



LIVINGSTON COUNTY, ILLINOIS NO. 99

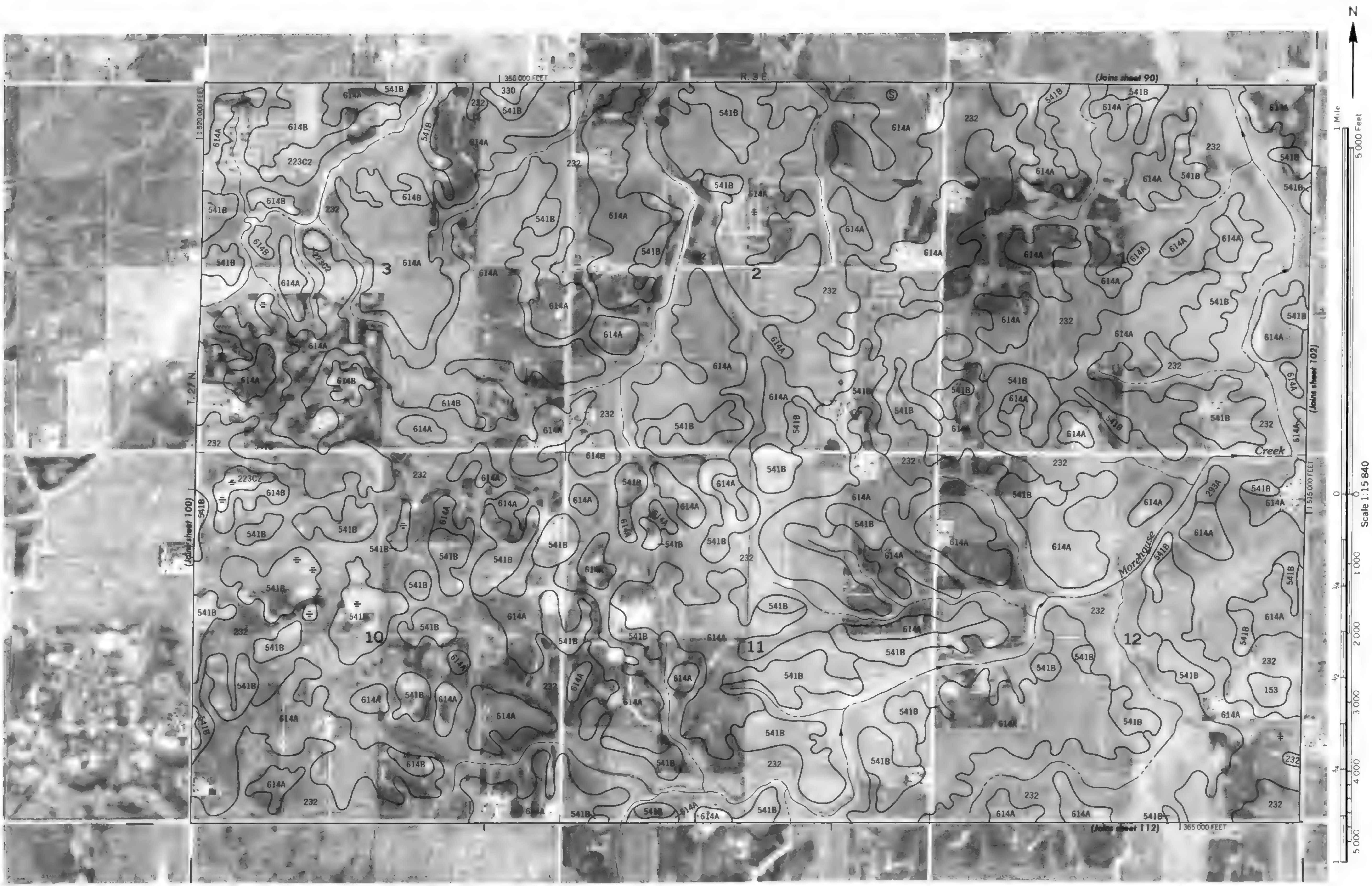
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

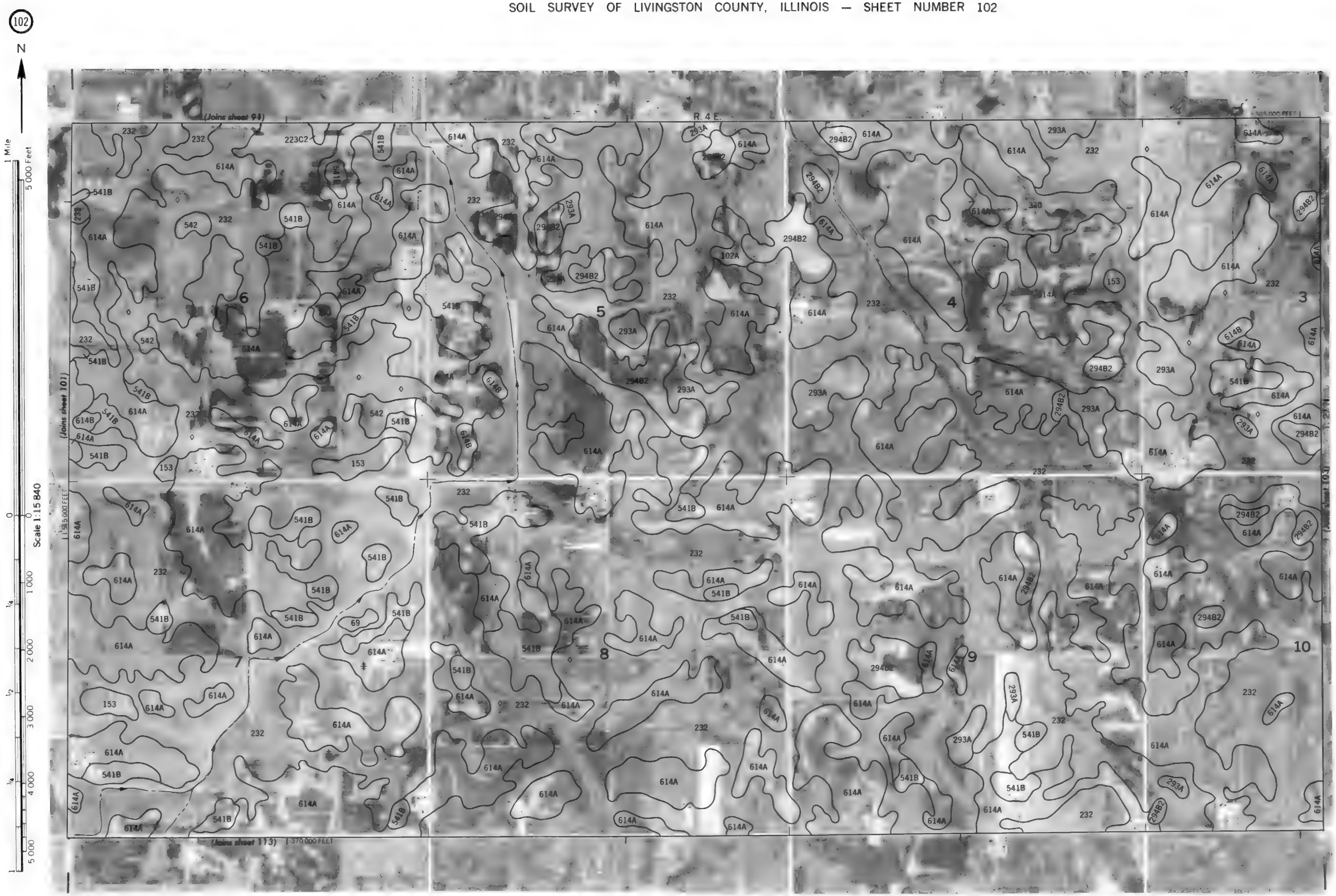


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 101

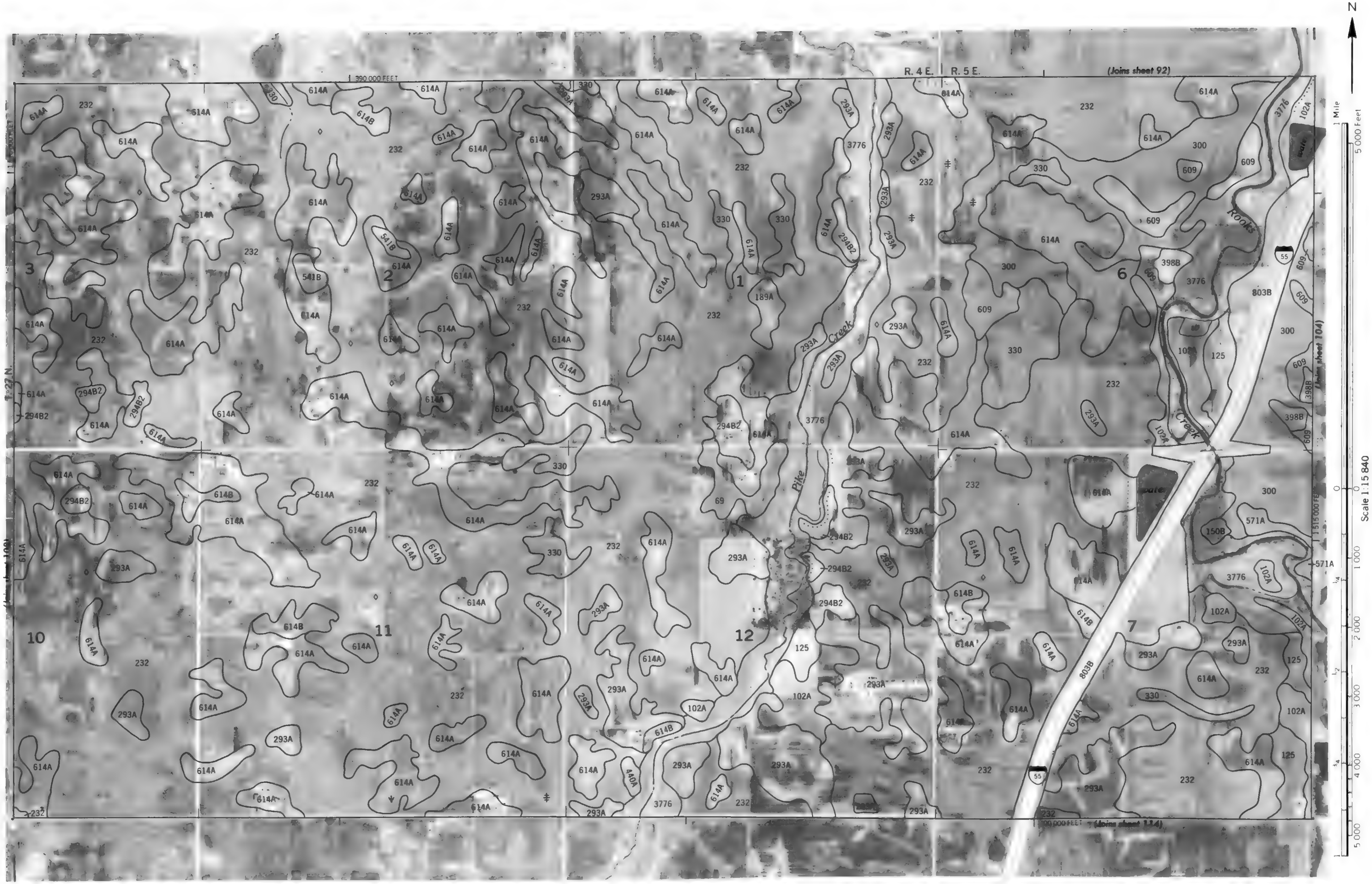
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

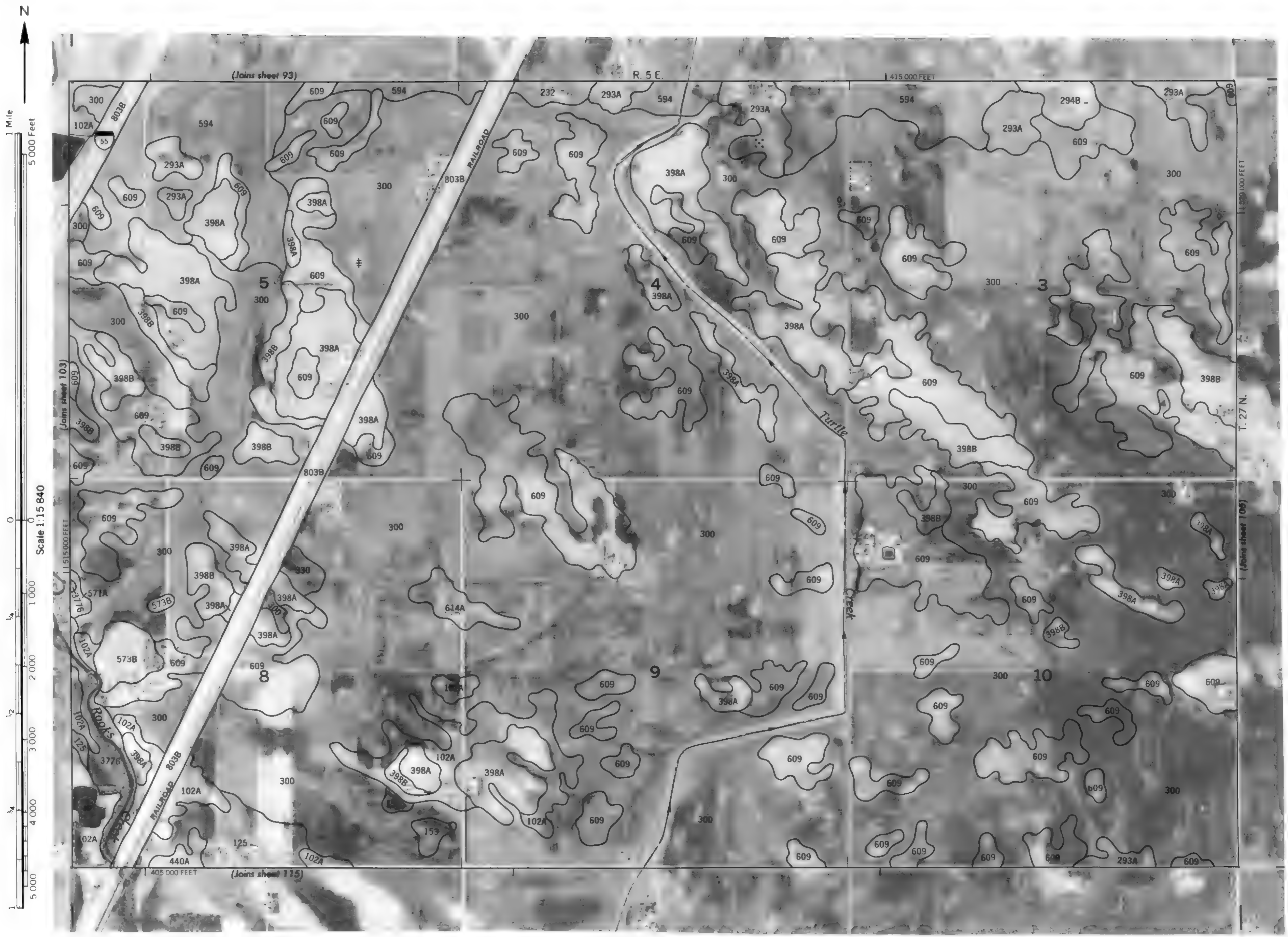
LIVINGSTON COUNTY, ILLINOIS NO. 102



LIVINGSTON COUNTY, ILLINOIS NO 103

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

104



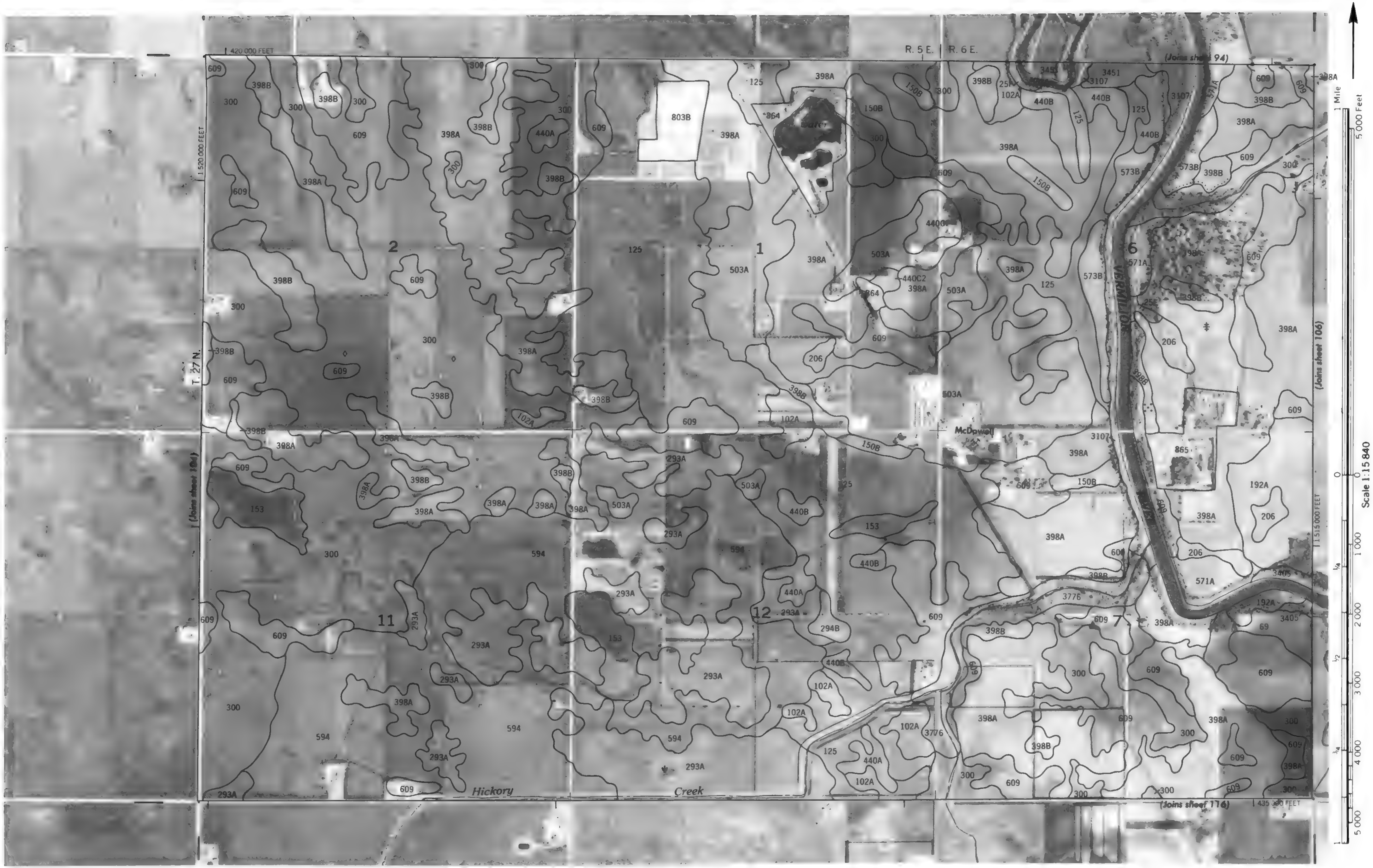
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 104

105

LIVINGSTON COUNTY, ILLINOIS NO. 105

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



106

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 106

107

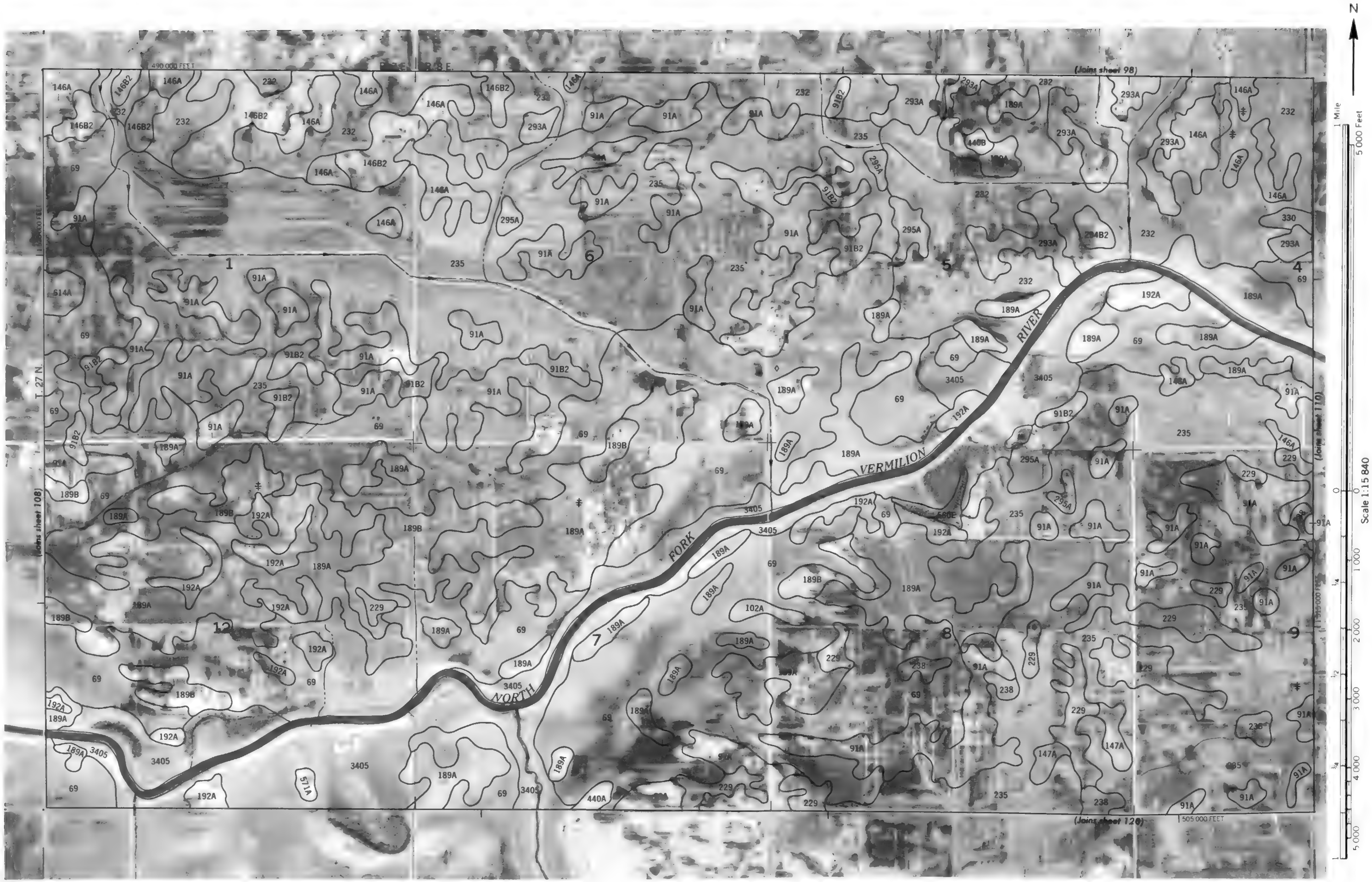
LIVINGSTON COUNTY, ILLINOIS NO. 107

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 108

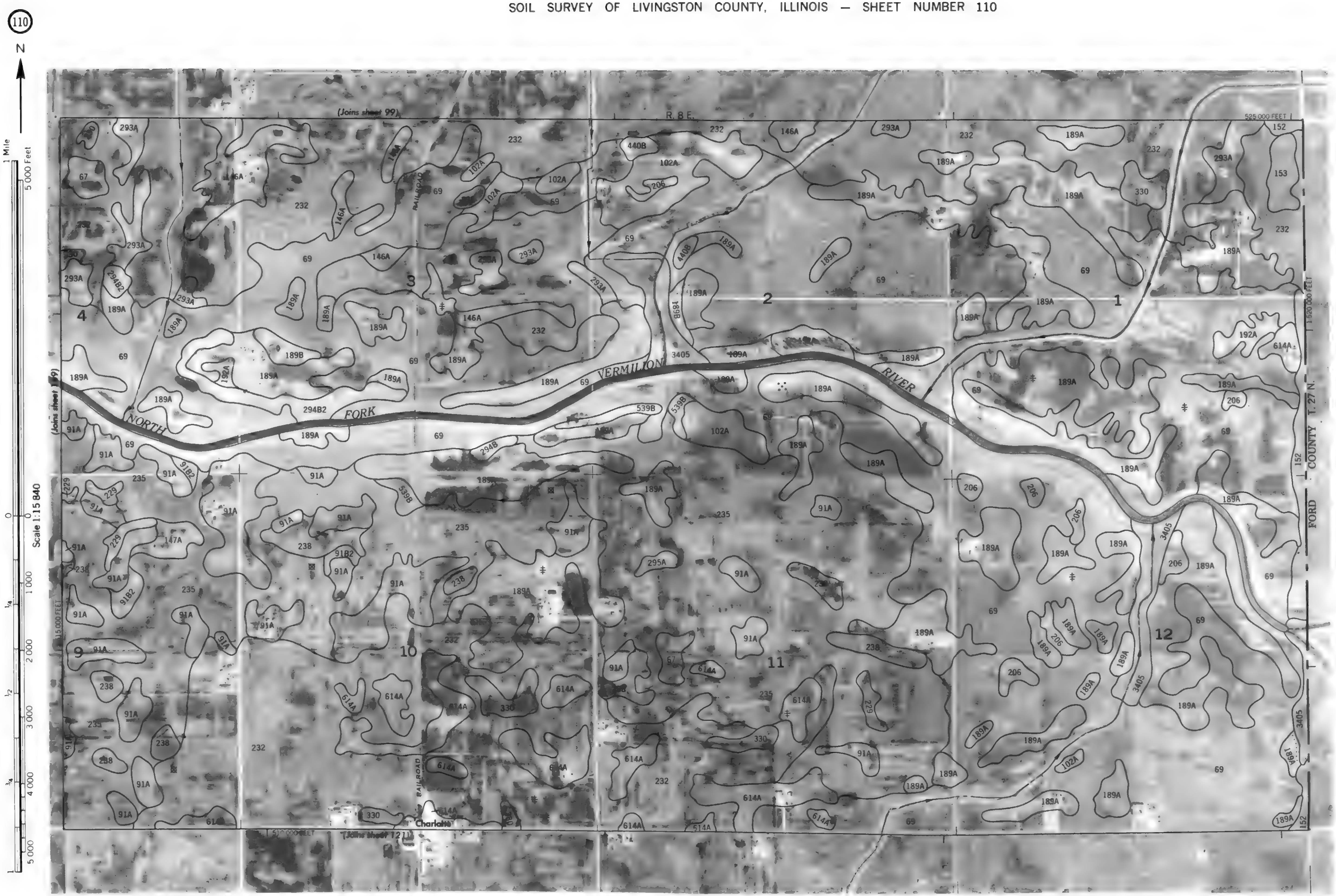
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

109



LIVINGSTON COUNTY, ILLINOIS NO. 109

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

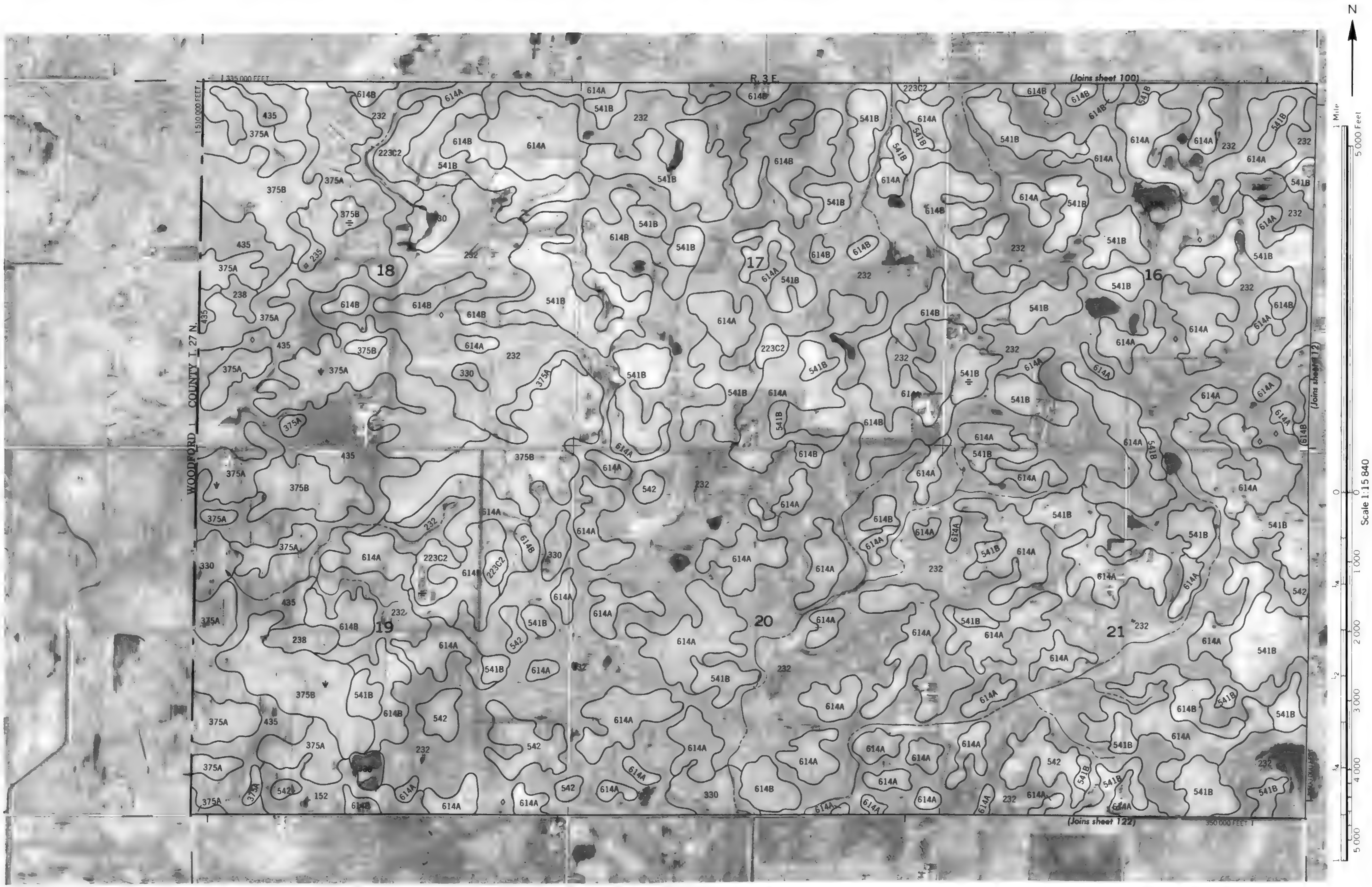


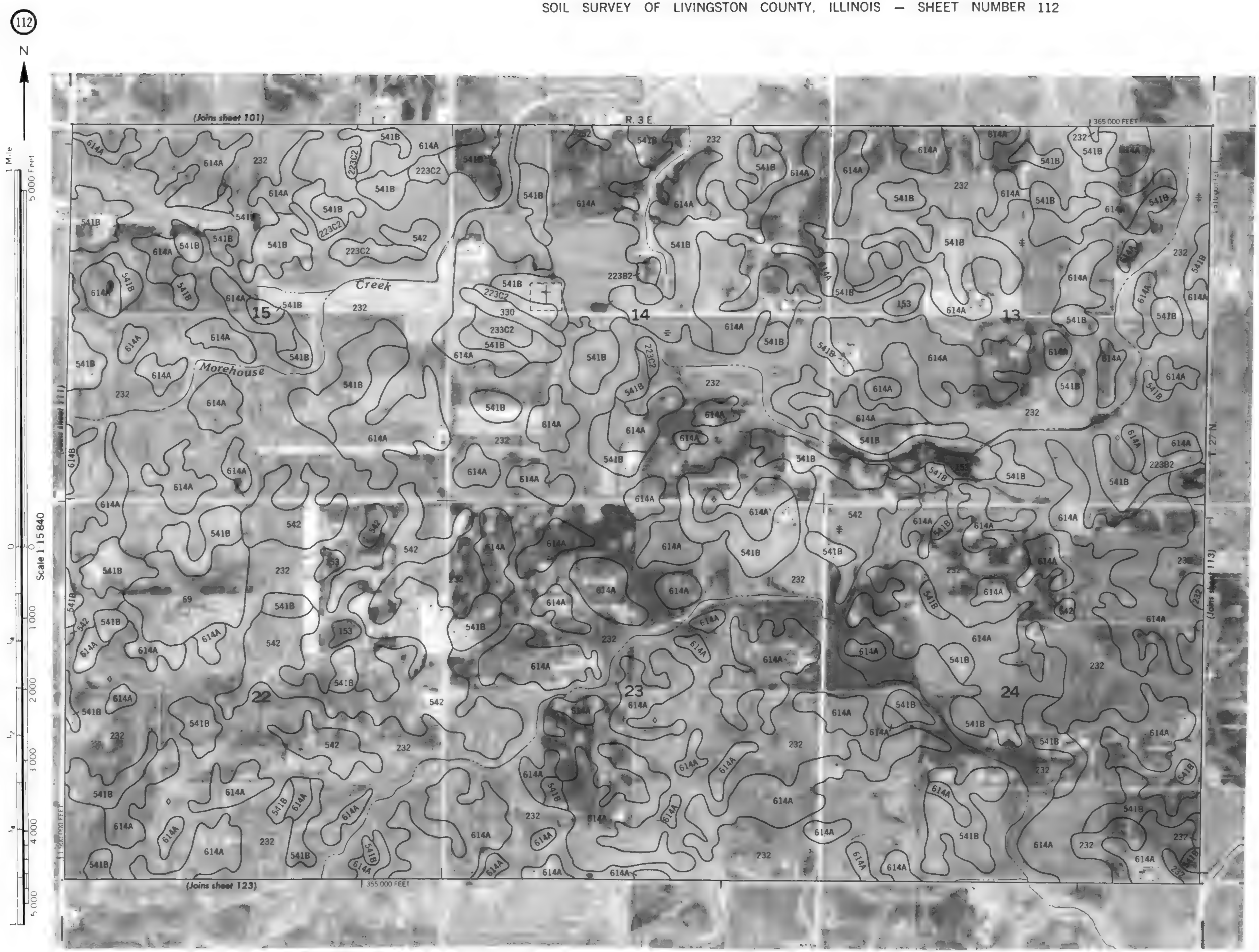
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(111)

LIVINGSTON COUNTY, ILLINOIS NO. 111

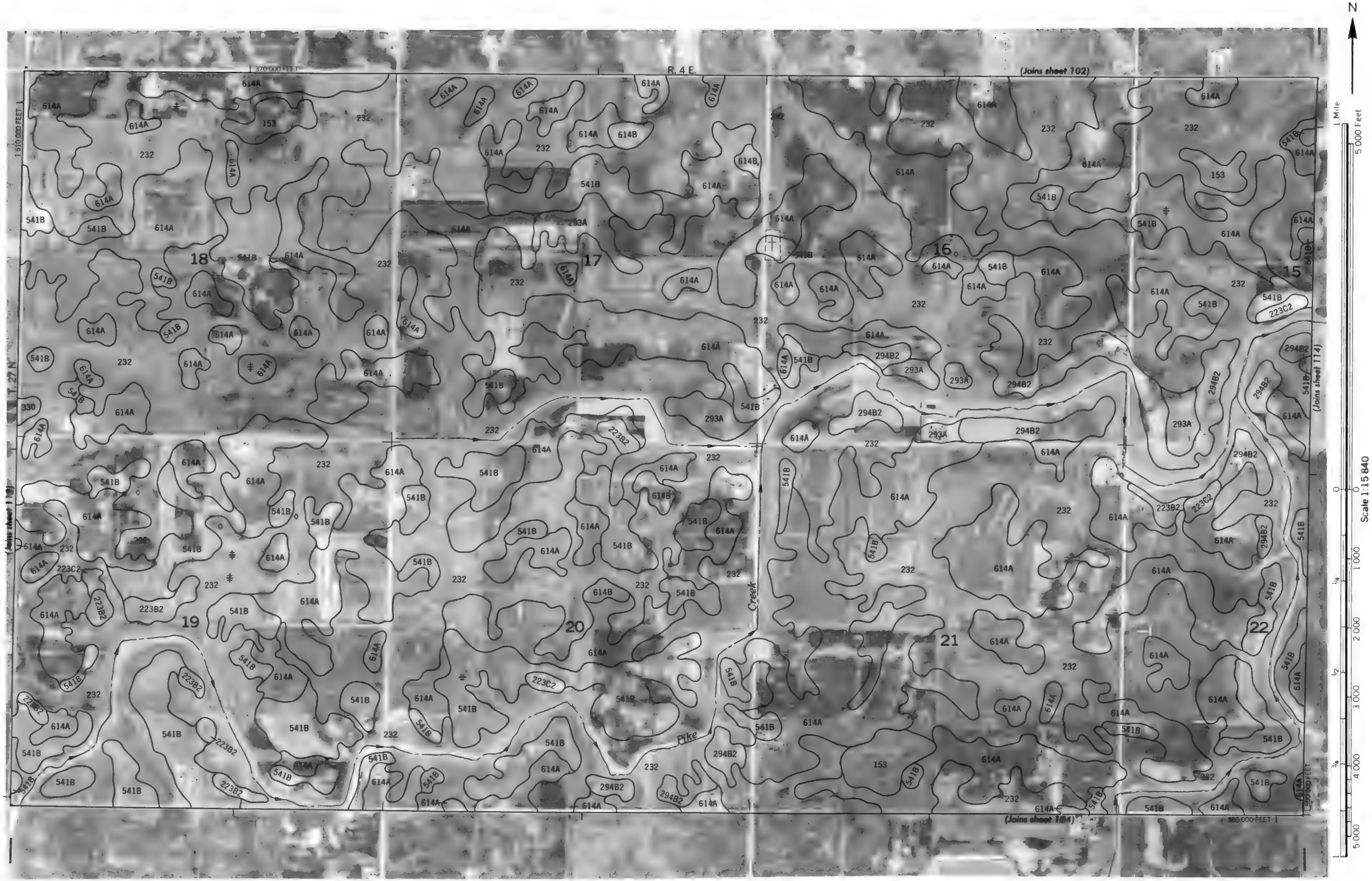
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

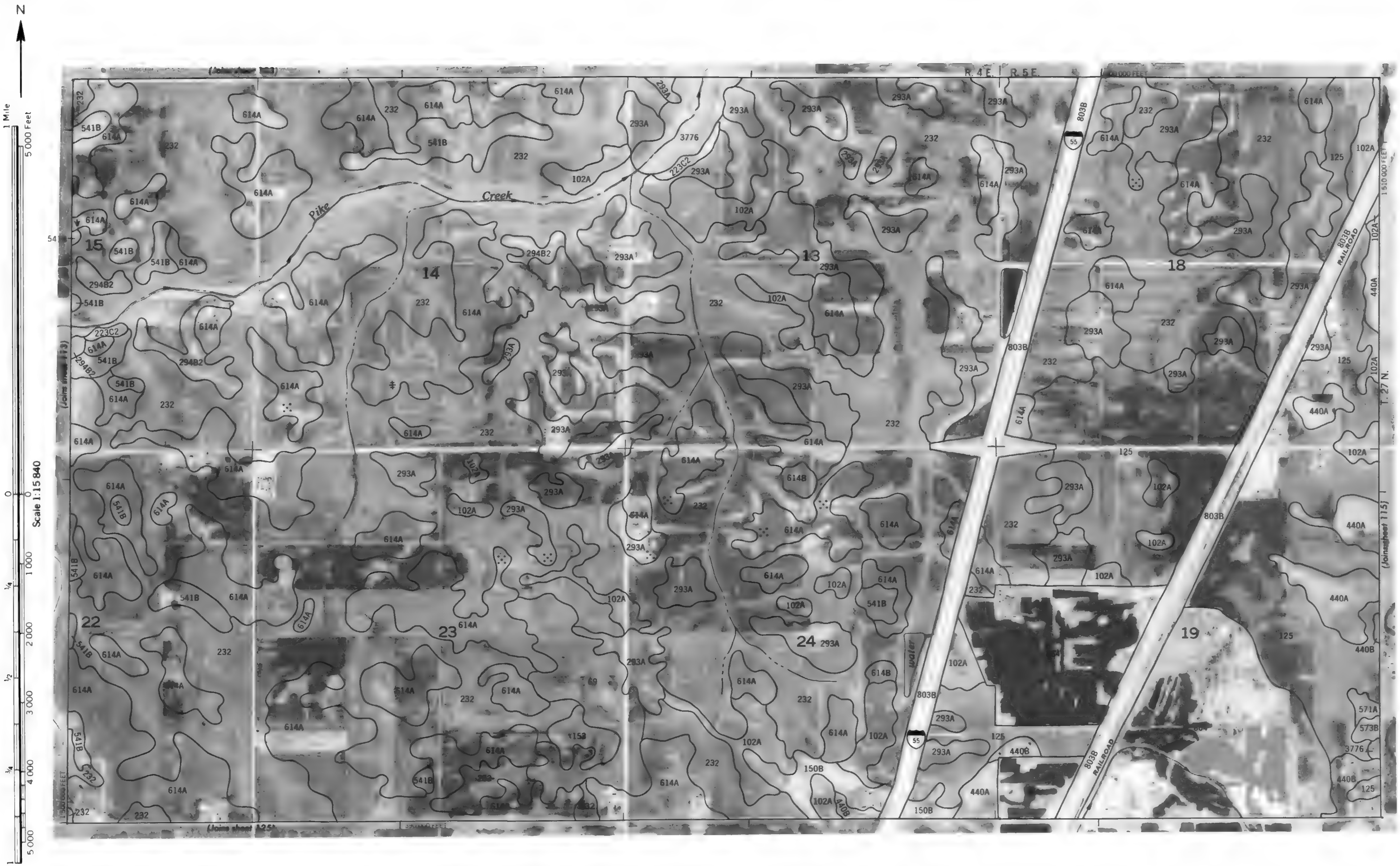
LIVINGSTON COUNTY, ILLINOIS NO. 112



LIVINGSTON COUNTY, ILLINOIS NO. 113

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

114



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 114

LIVINGSTON COUNTY, ILLINOIS NO. 115

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

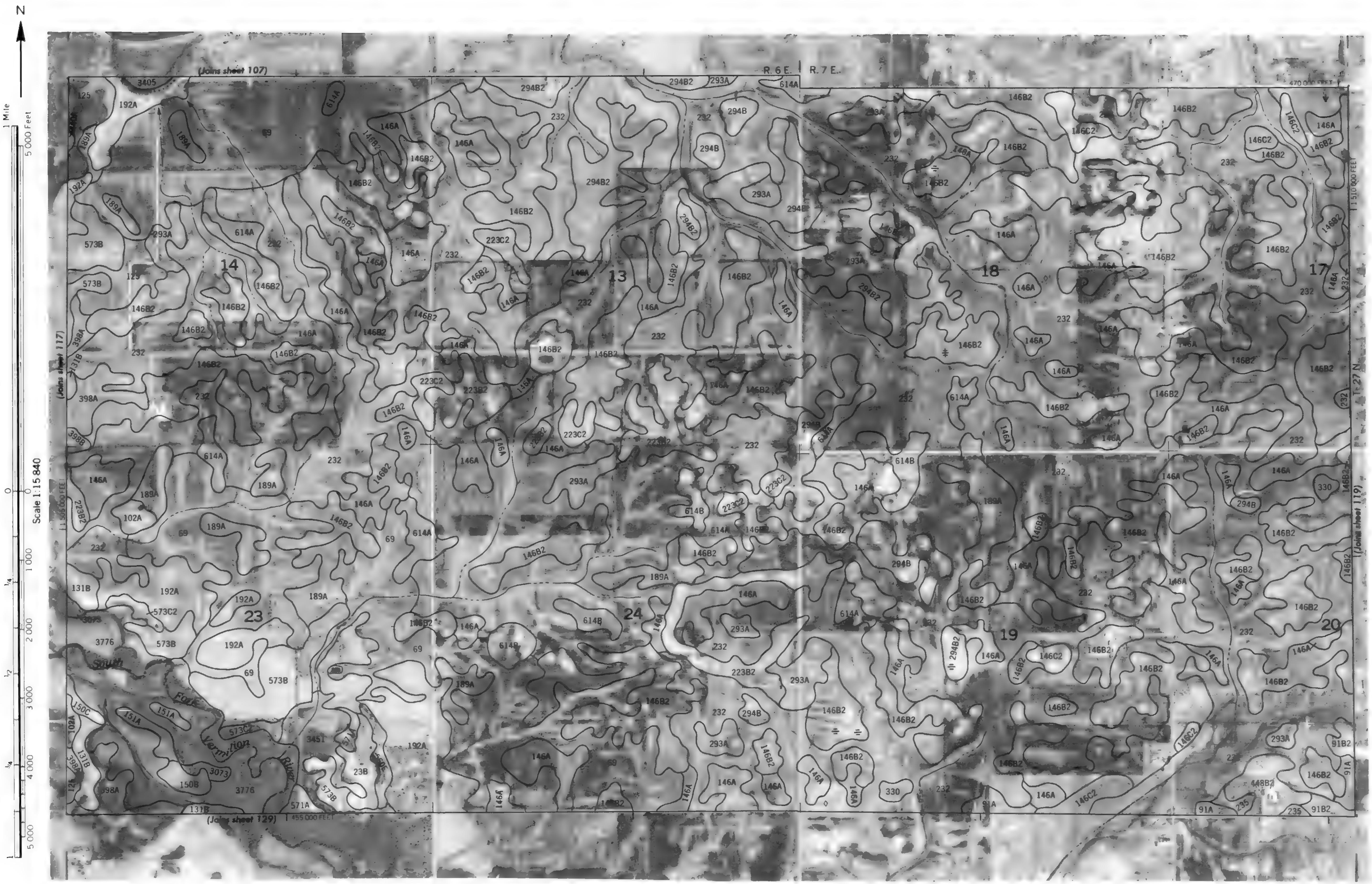
116

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

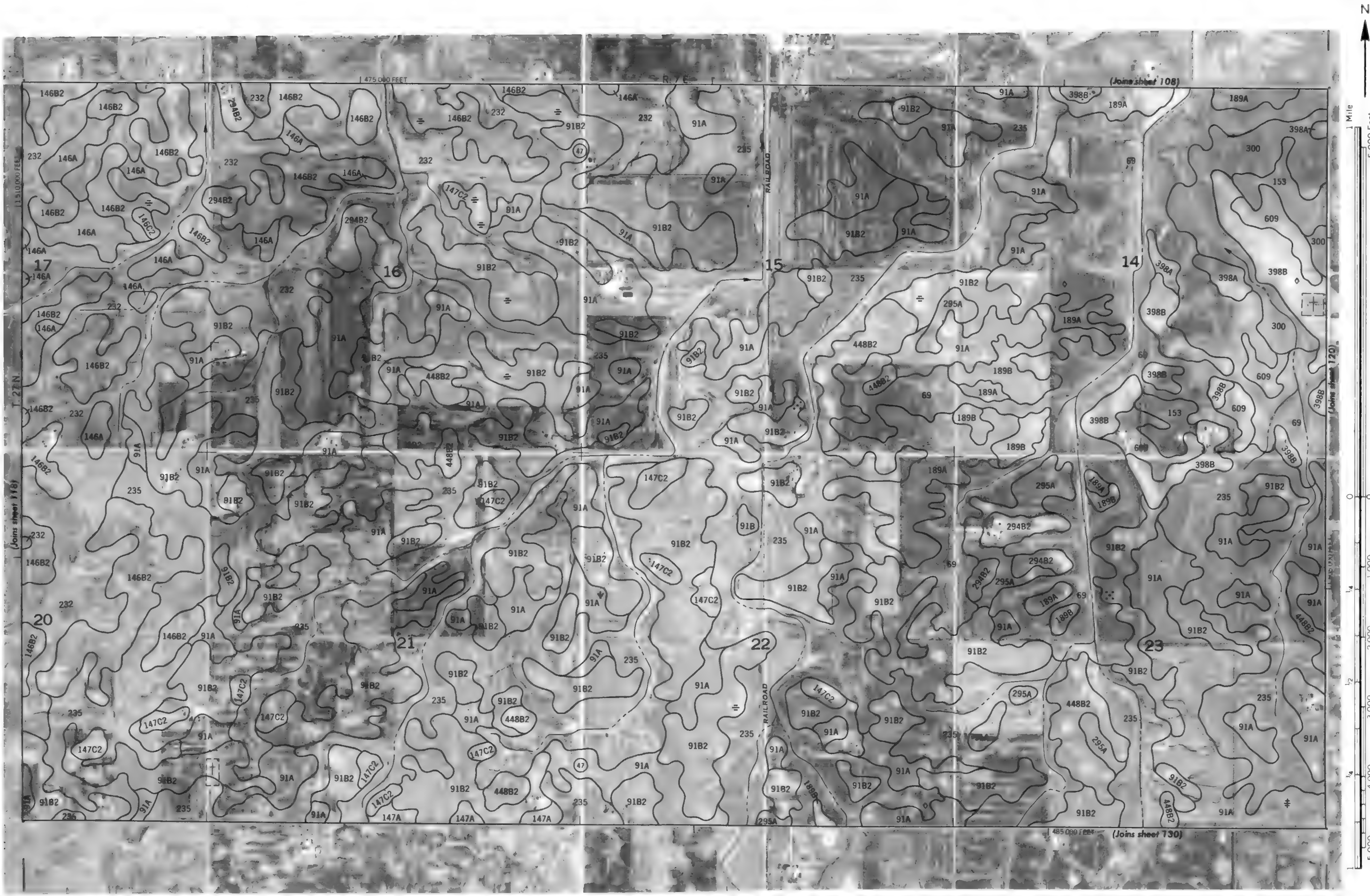
LIVINGSTON COUNTY, ILLINOIS NO. 117

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

118



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



LIVINGSTON COUNTY, ILLINOIS NO. 119

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

120

N

1 Mile
5 000 Feet
Scale 1:15 840
0 1 000 2 000 3 000 4 000 5 000

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983–1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

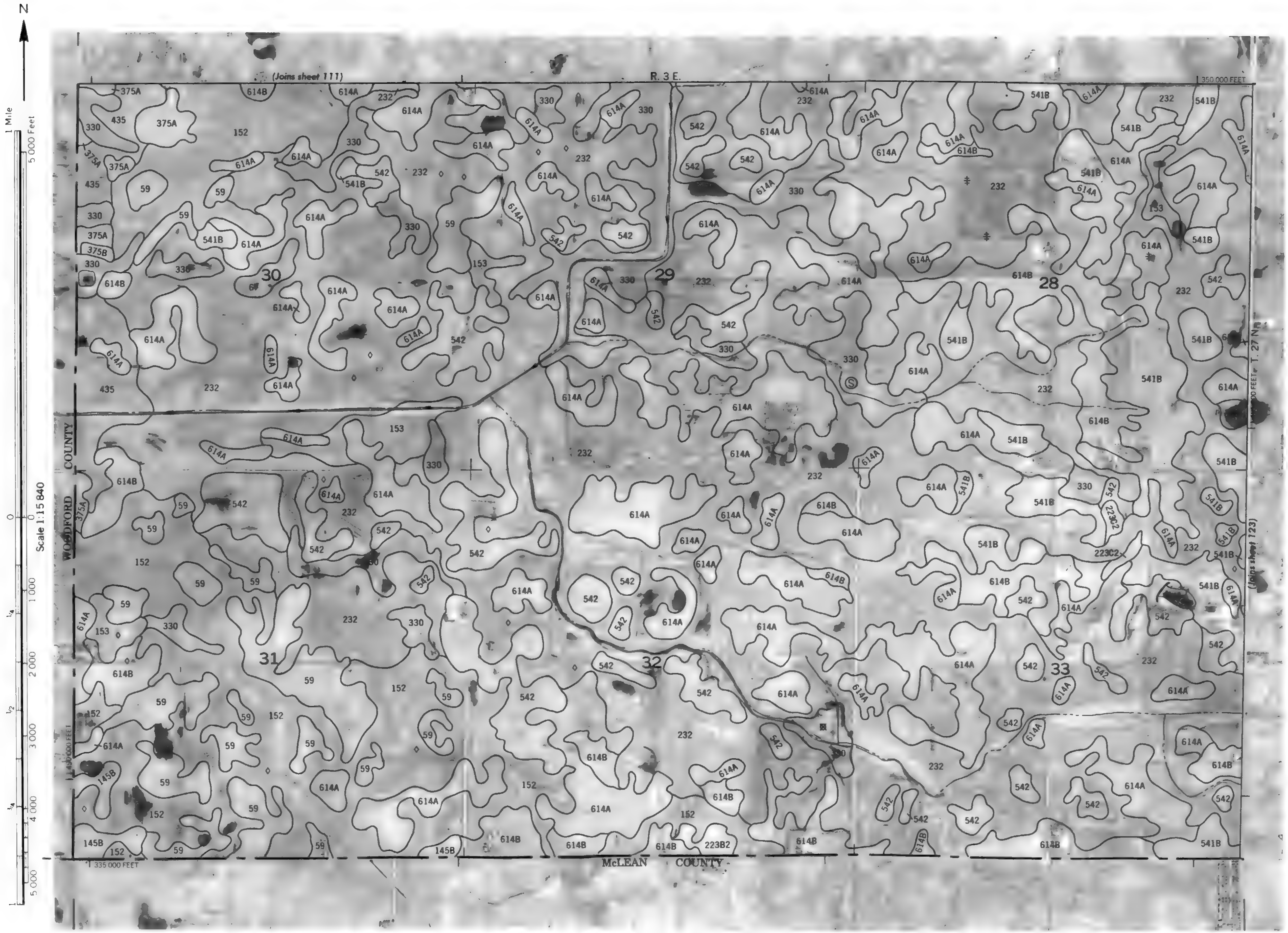
LIVINGSTON COUNTY, ILLINOIS NO. 120

121

LIVINGSTON COUNTY, ILLINOIS NO. 121

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

122



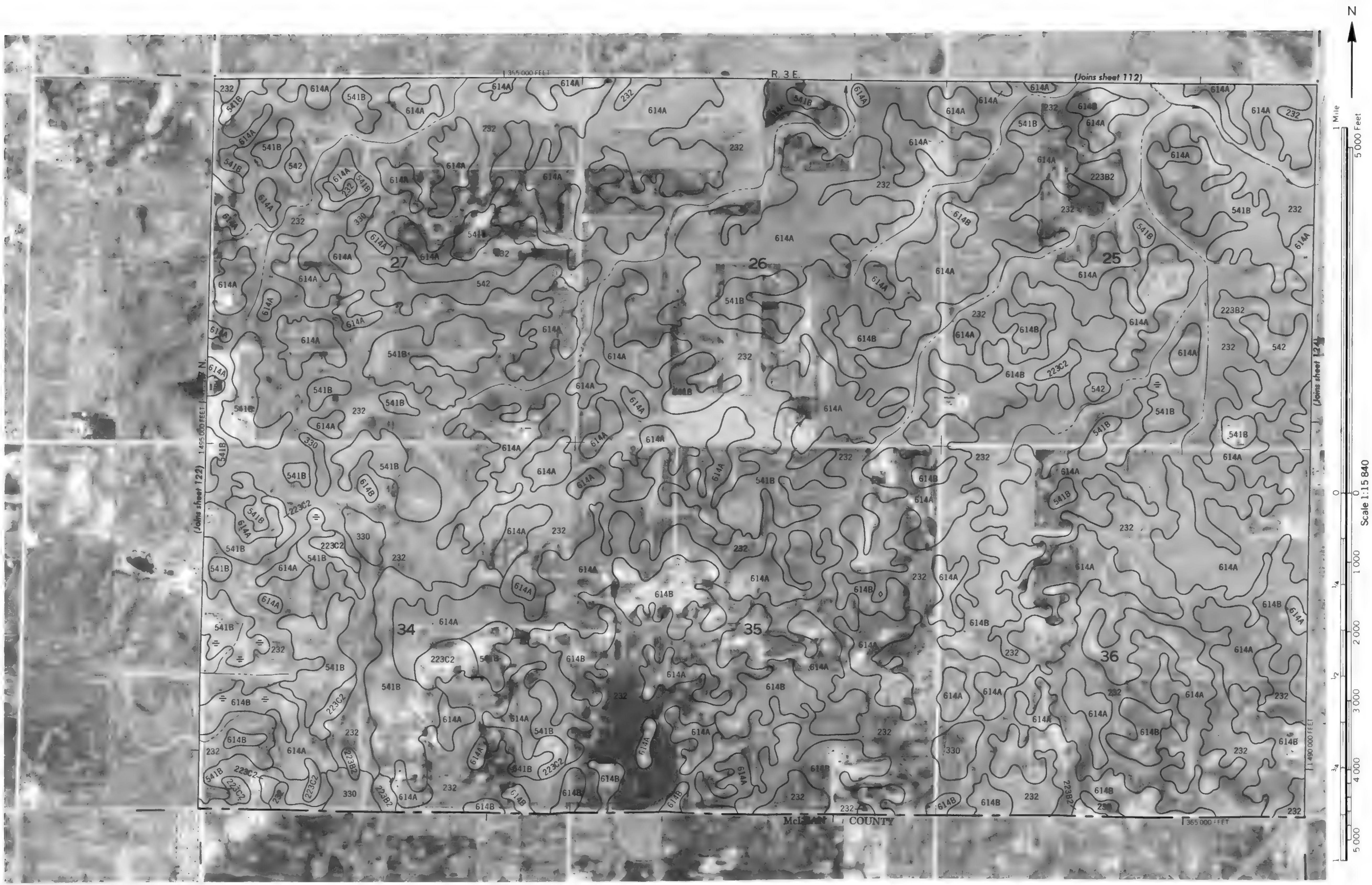
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 122

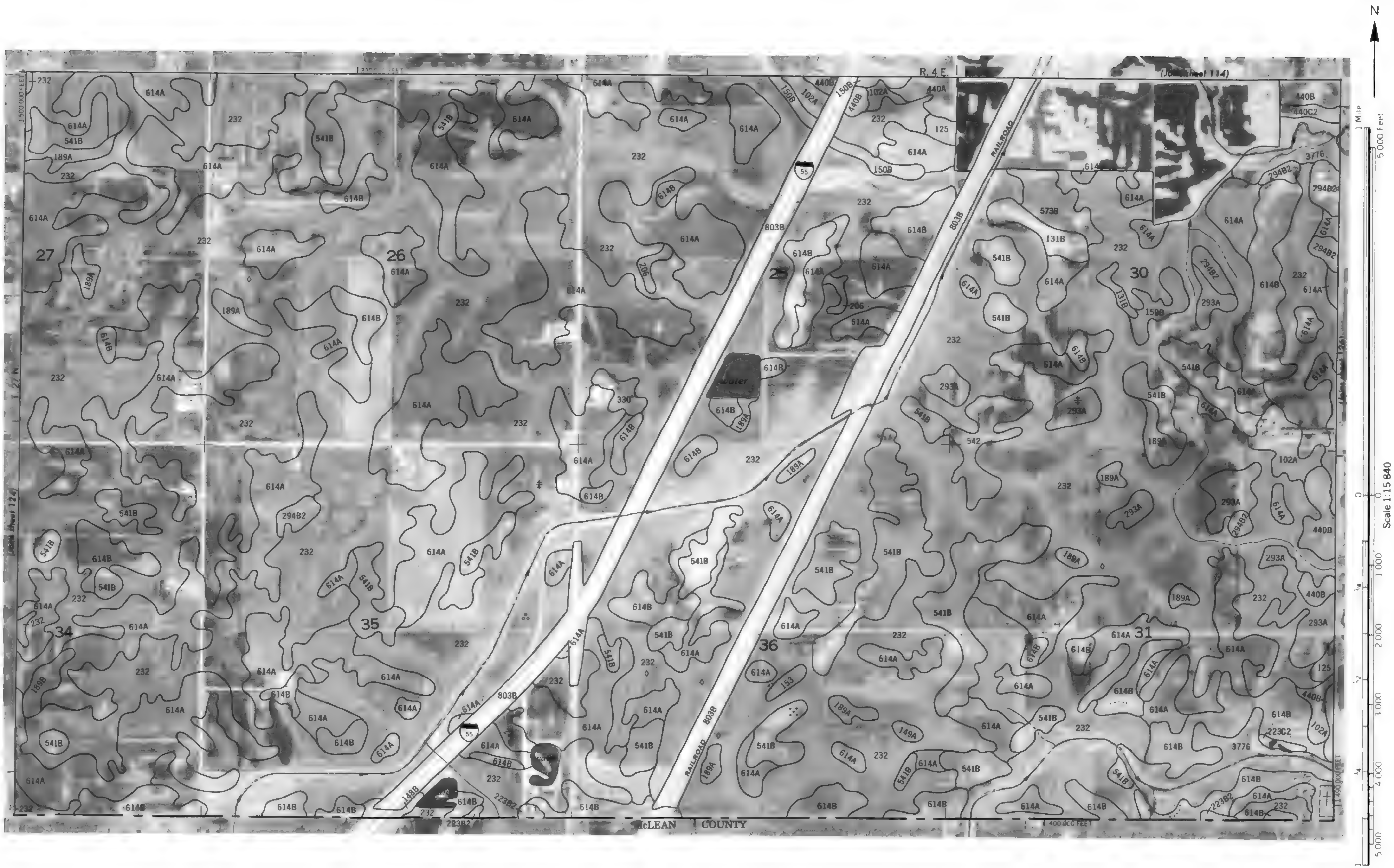
123

LIVINGSTON COUNTY, ILLINOIS NO. 123

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned

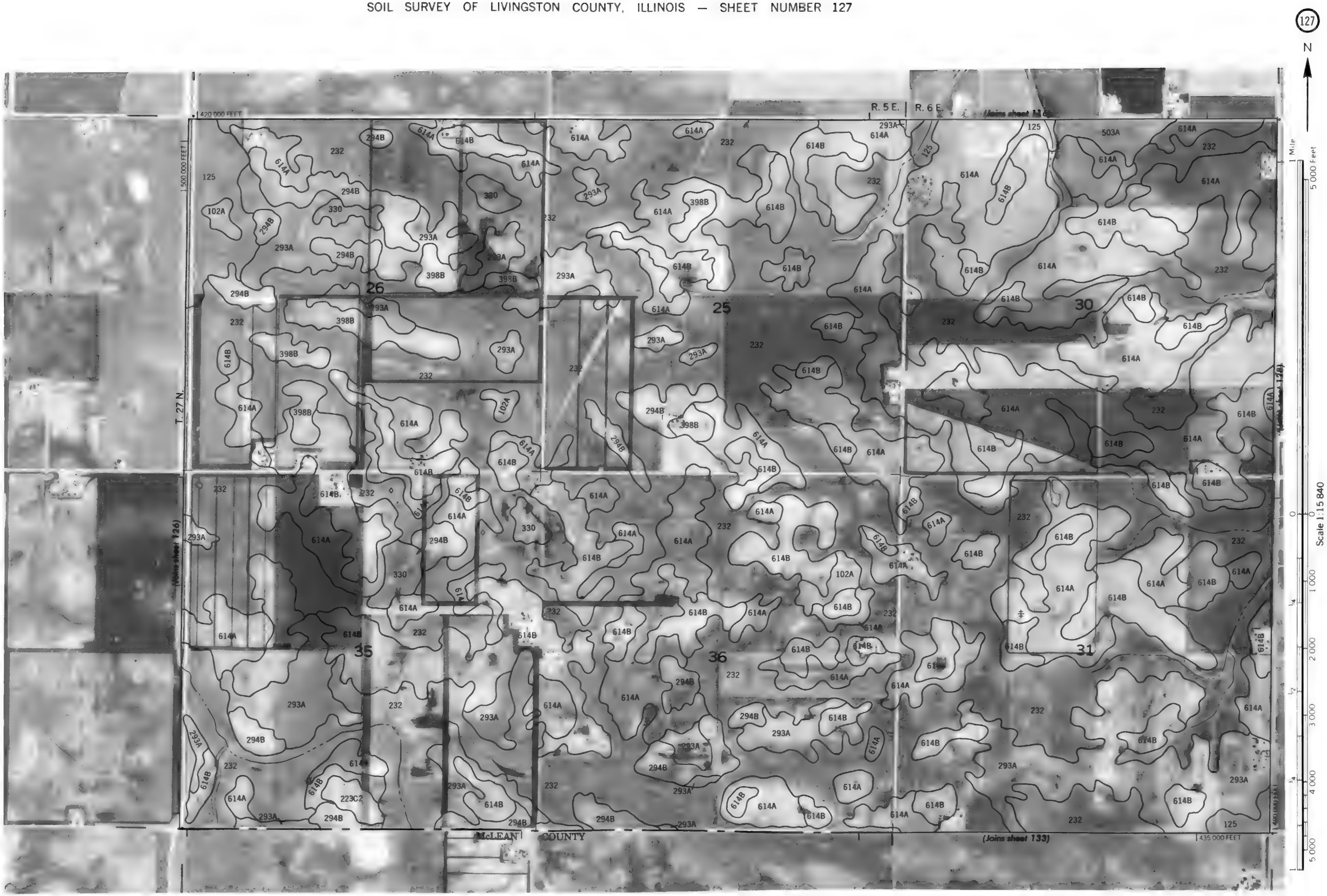


LIVINGSTON COUNTY, ILLINOIS NO. 125

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

126

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned



LIVINGSTON COUNTY, ILLINOIS NO. 127

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

128

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 128

129

N

Scale 1:15 840

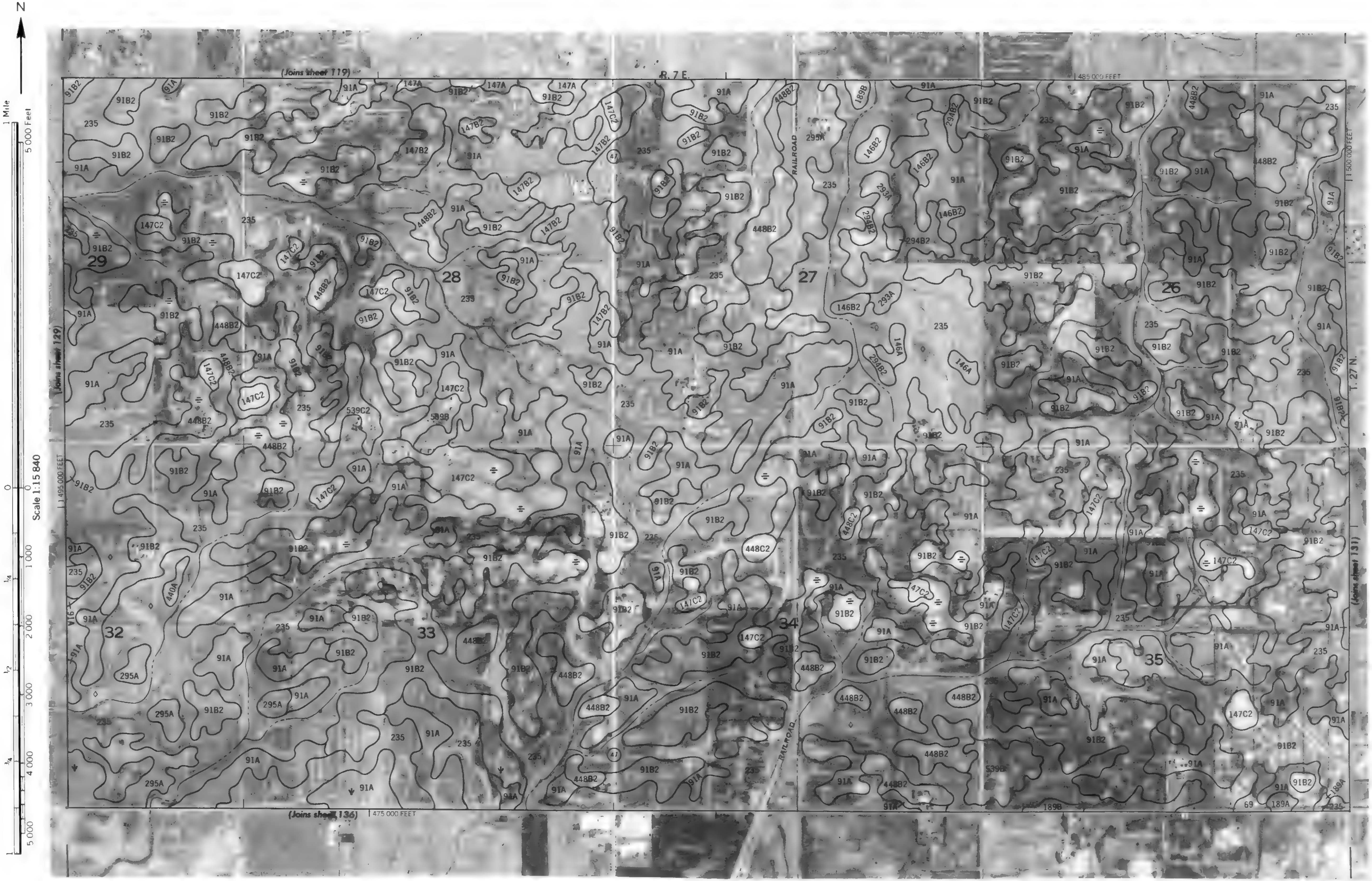
1 Mile

5 000 Feet

LIVINGSTON COUNTY, ILLINOIS NO. 129

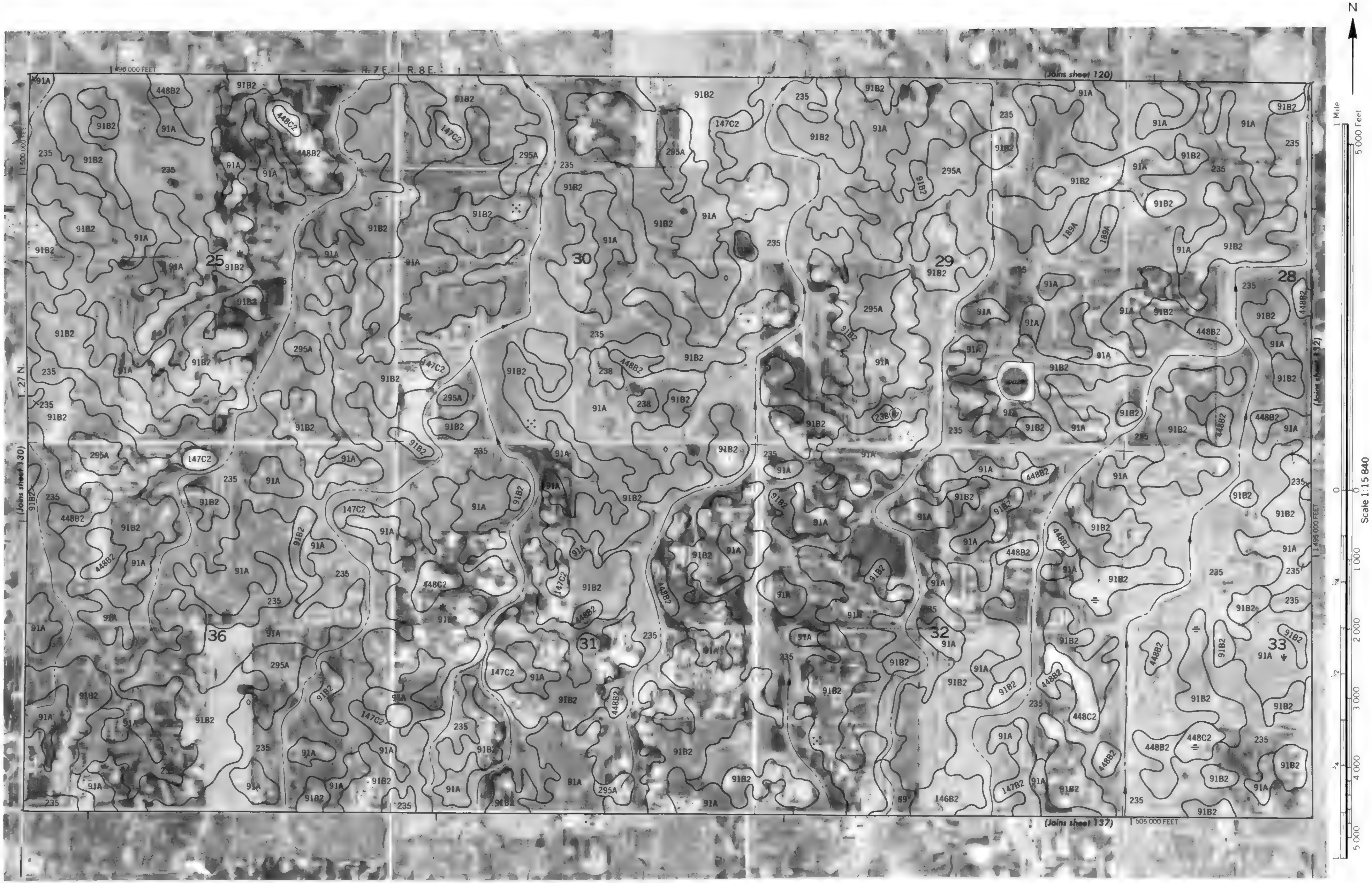
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983–1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

130



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

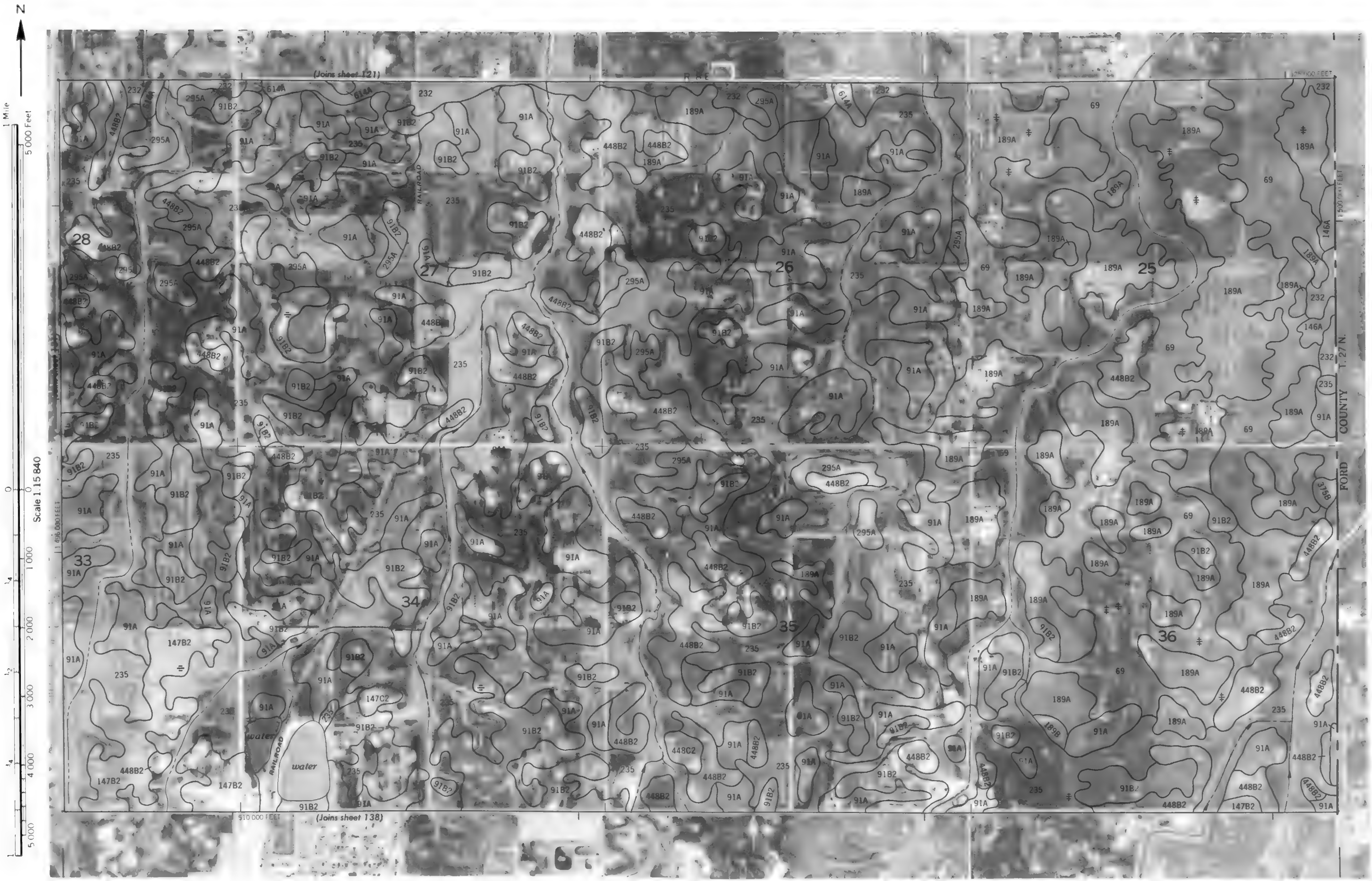
131



LIVINGSTON COUNTY, ILLINOIS NO. 131

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

132

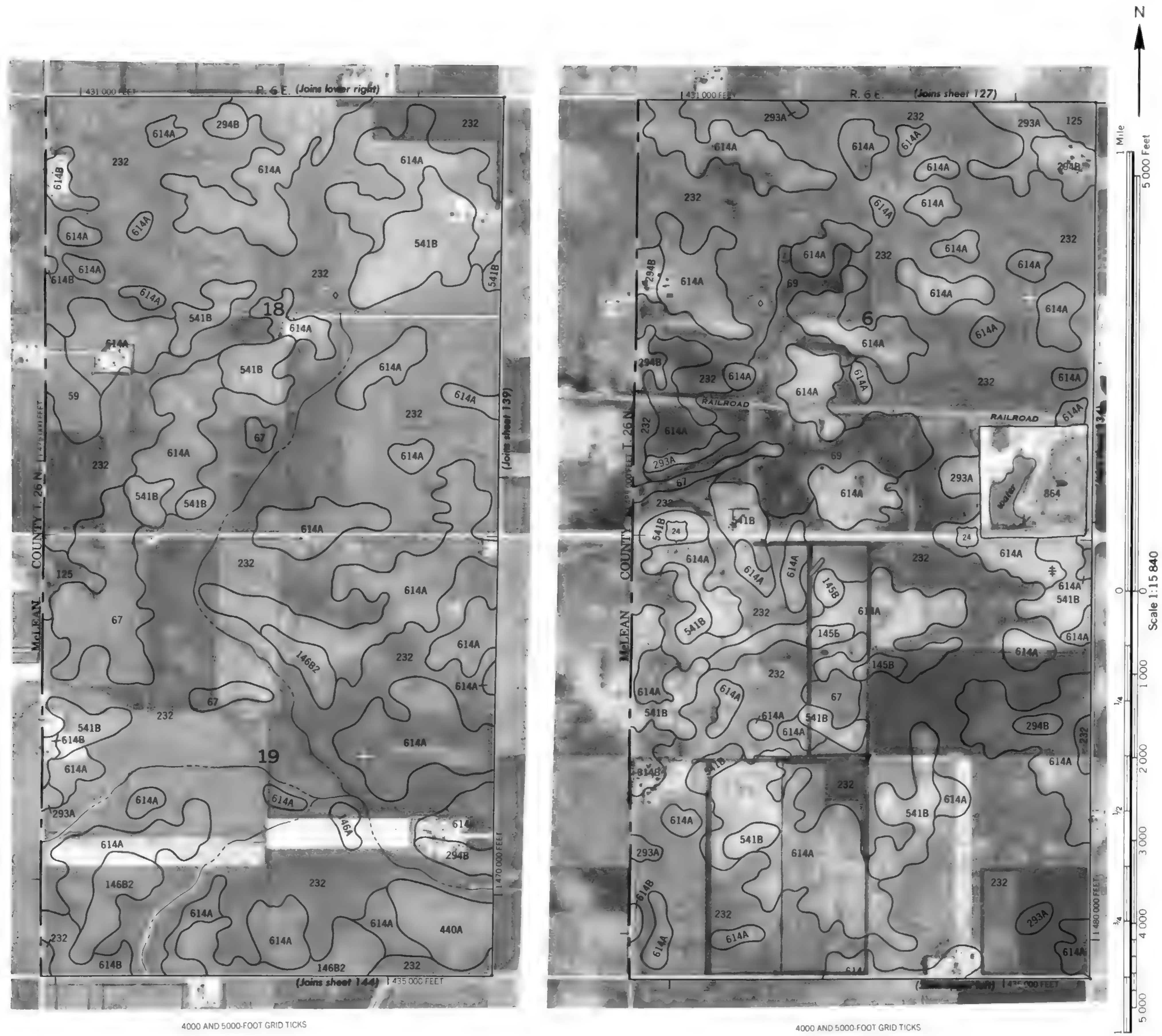


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 132

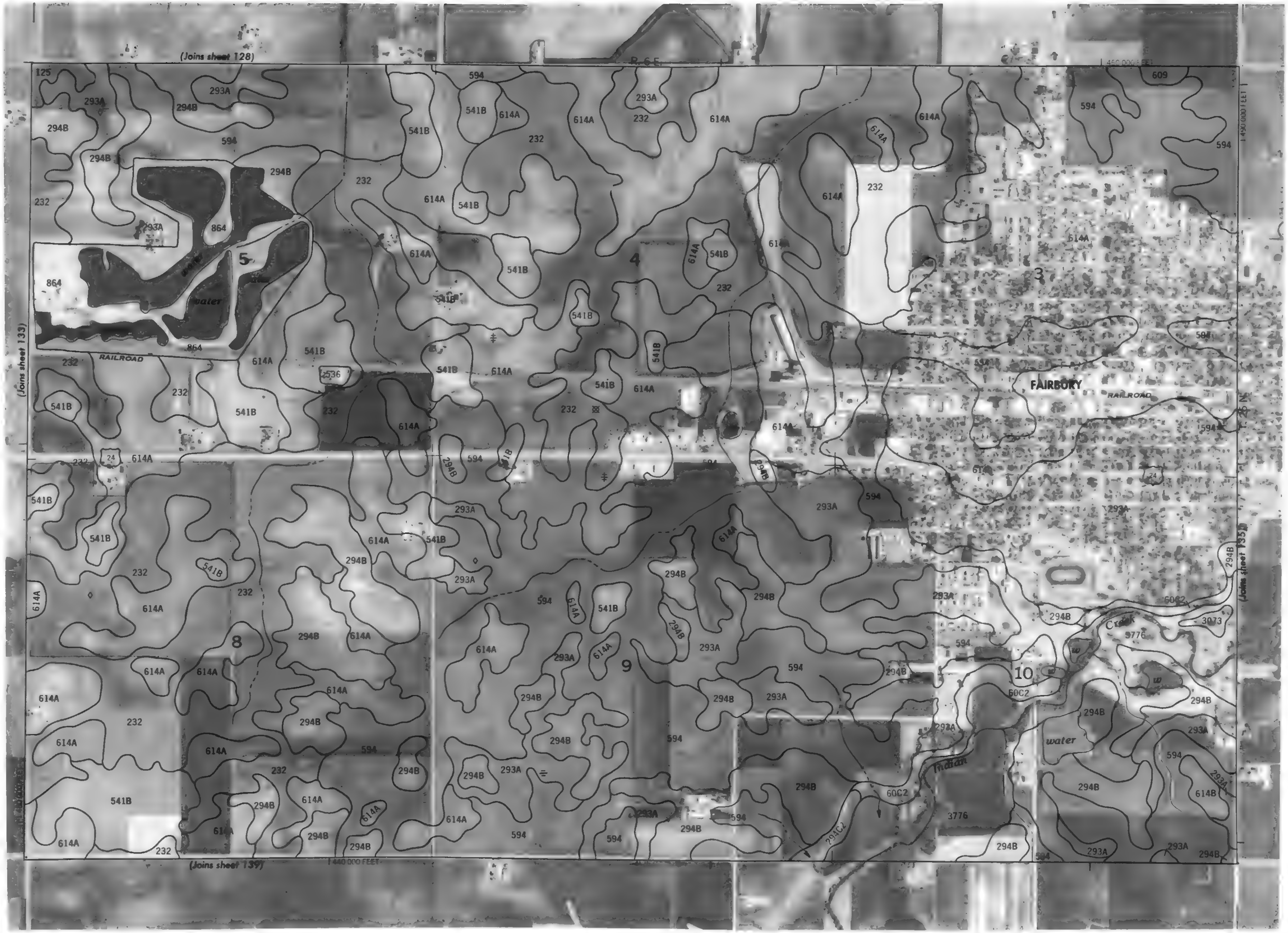
LIVINGSTON COUNTY, ILLINOIS NO. 133

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



134

N



Scale 1:15 840

1 Mile

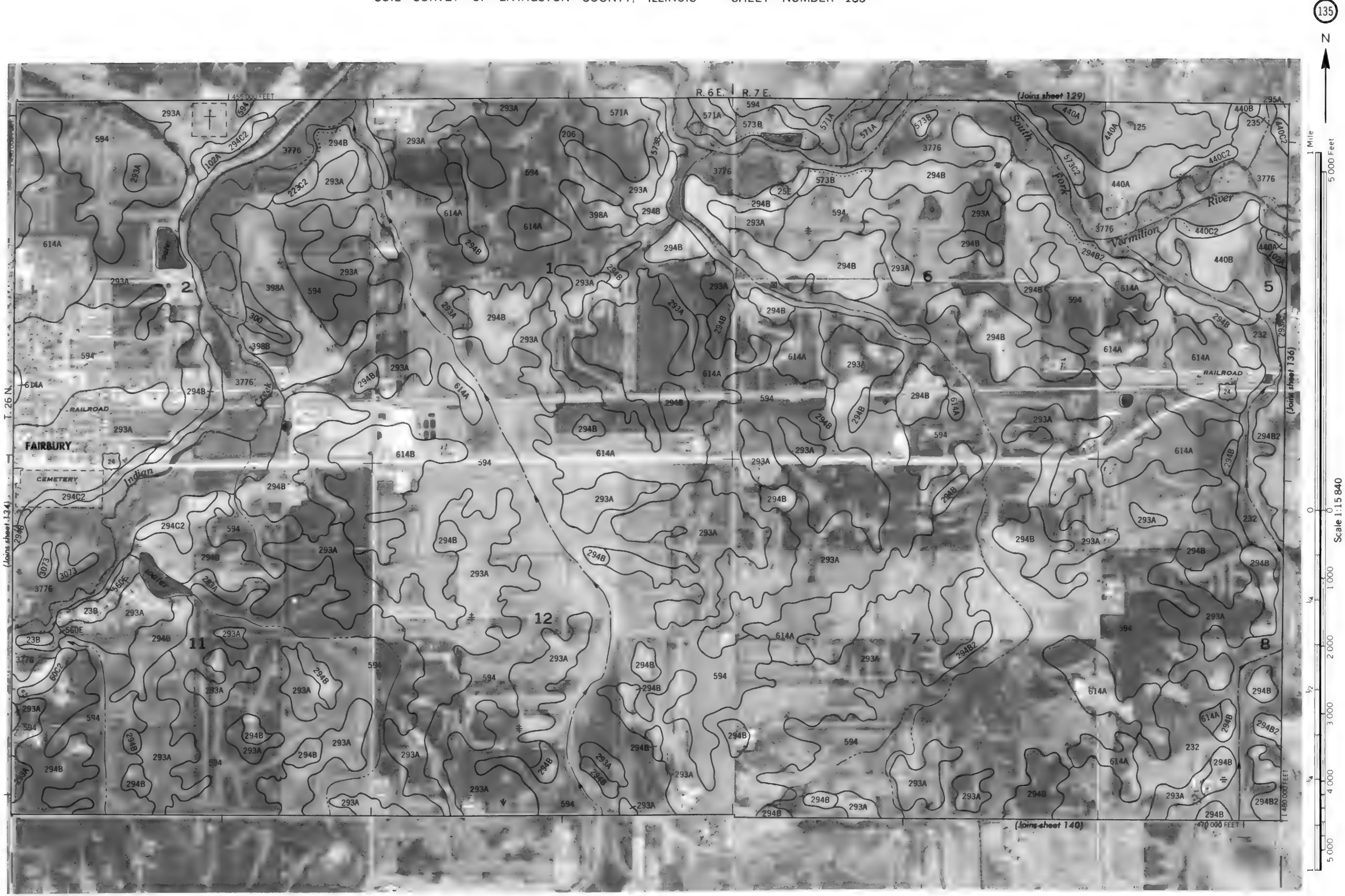
5 000 Feet

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

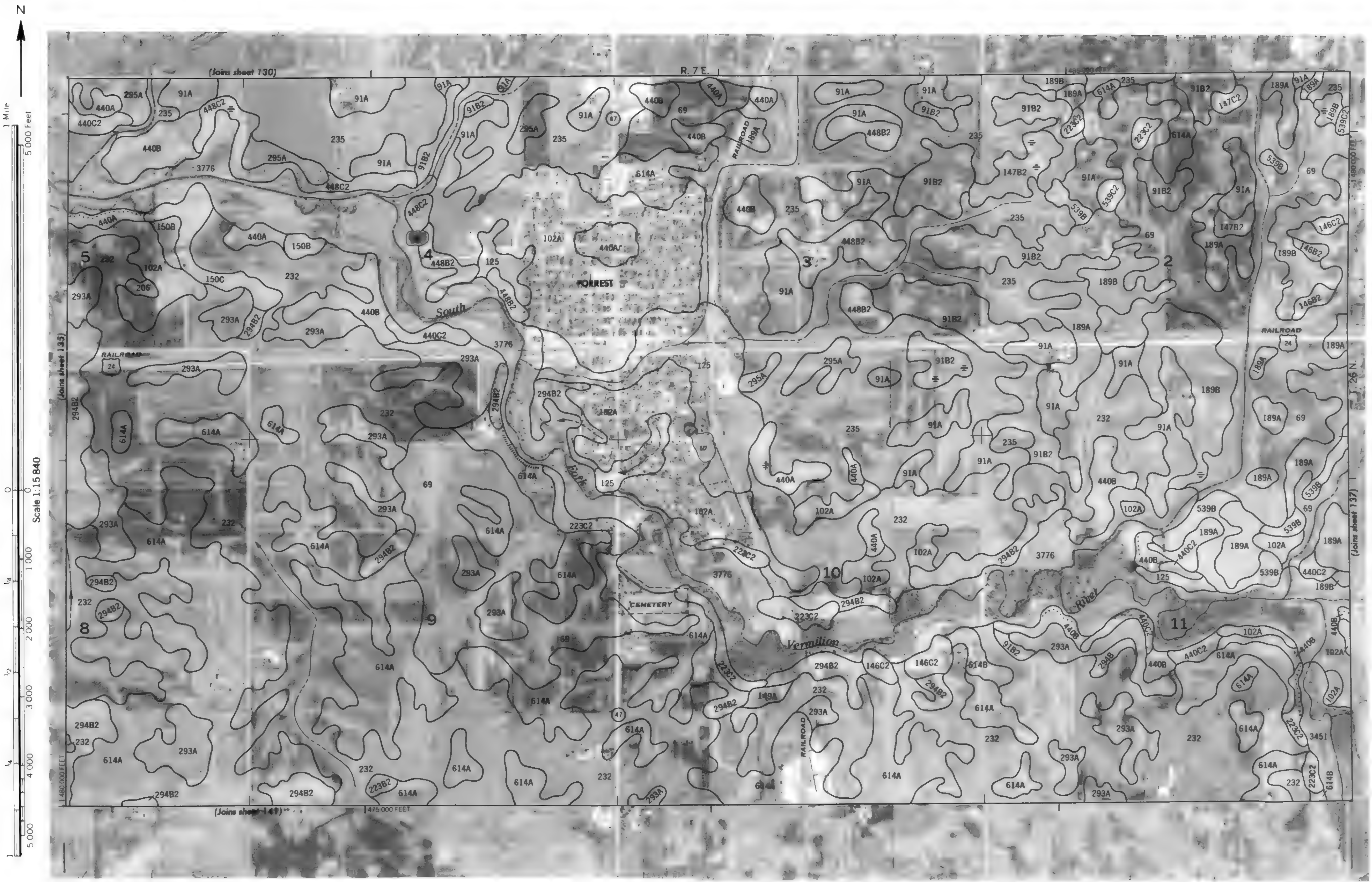
LIVINGSTON COUNTY, ILLINOIS NO. 134

LIVINGSTON COUNTY, ILLINOIS NO. 135

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 136

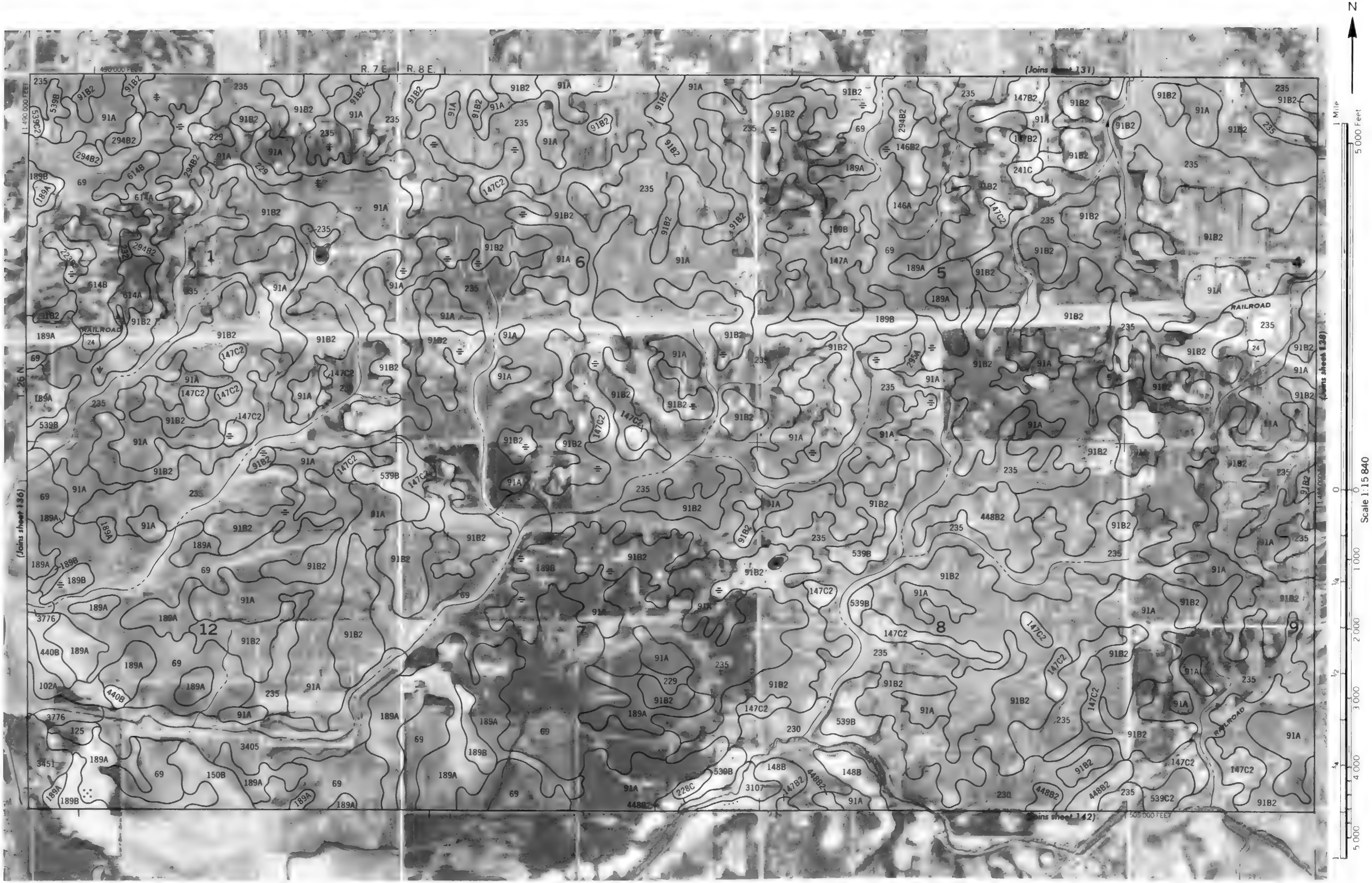


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

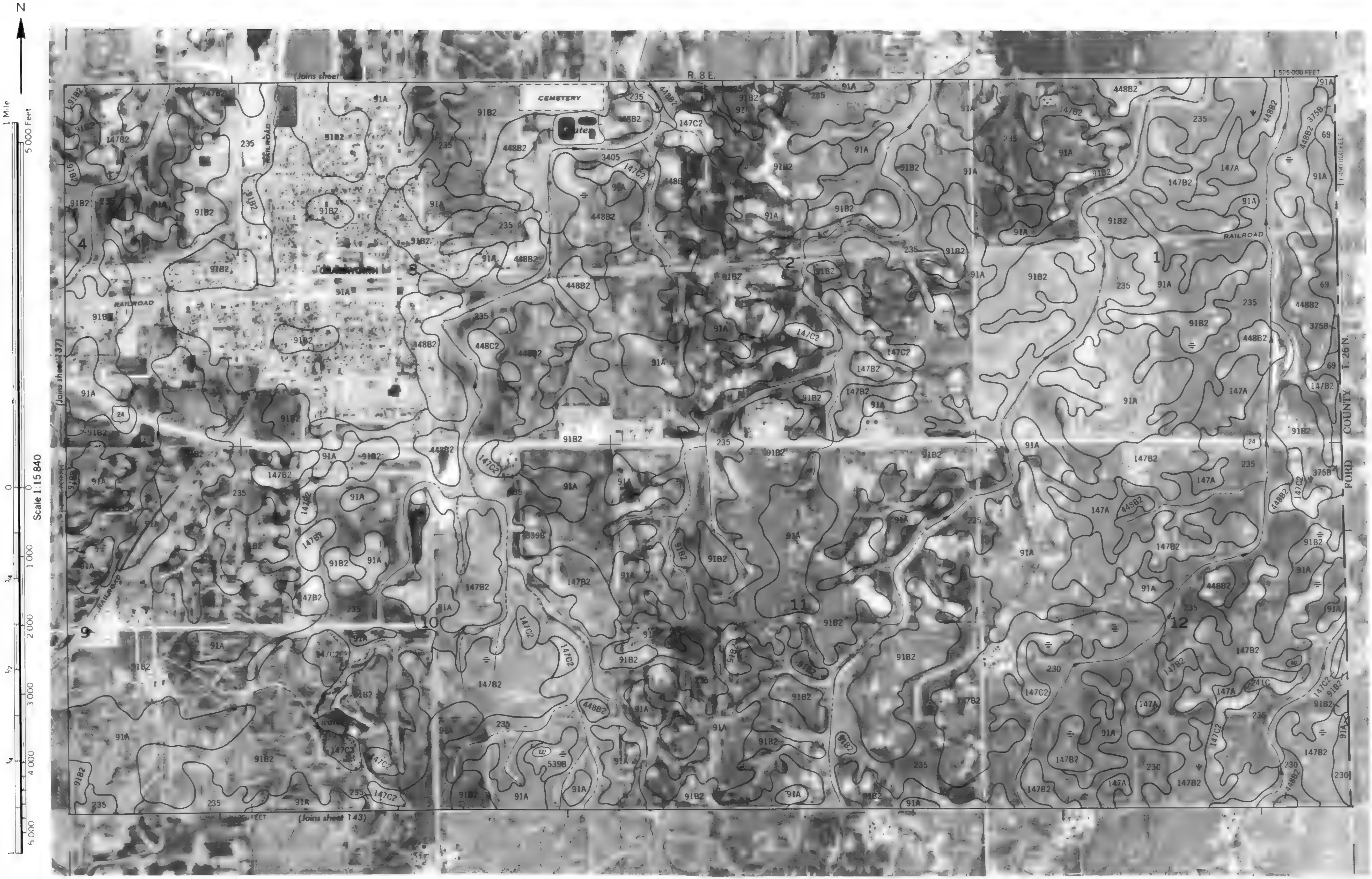
LIVINGSTON COUNTY, ILLINOIS NO. 136

LIVINGSTON COUNTY, ILLINOIS NO. 137

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

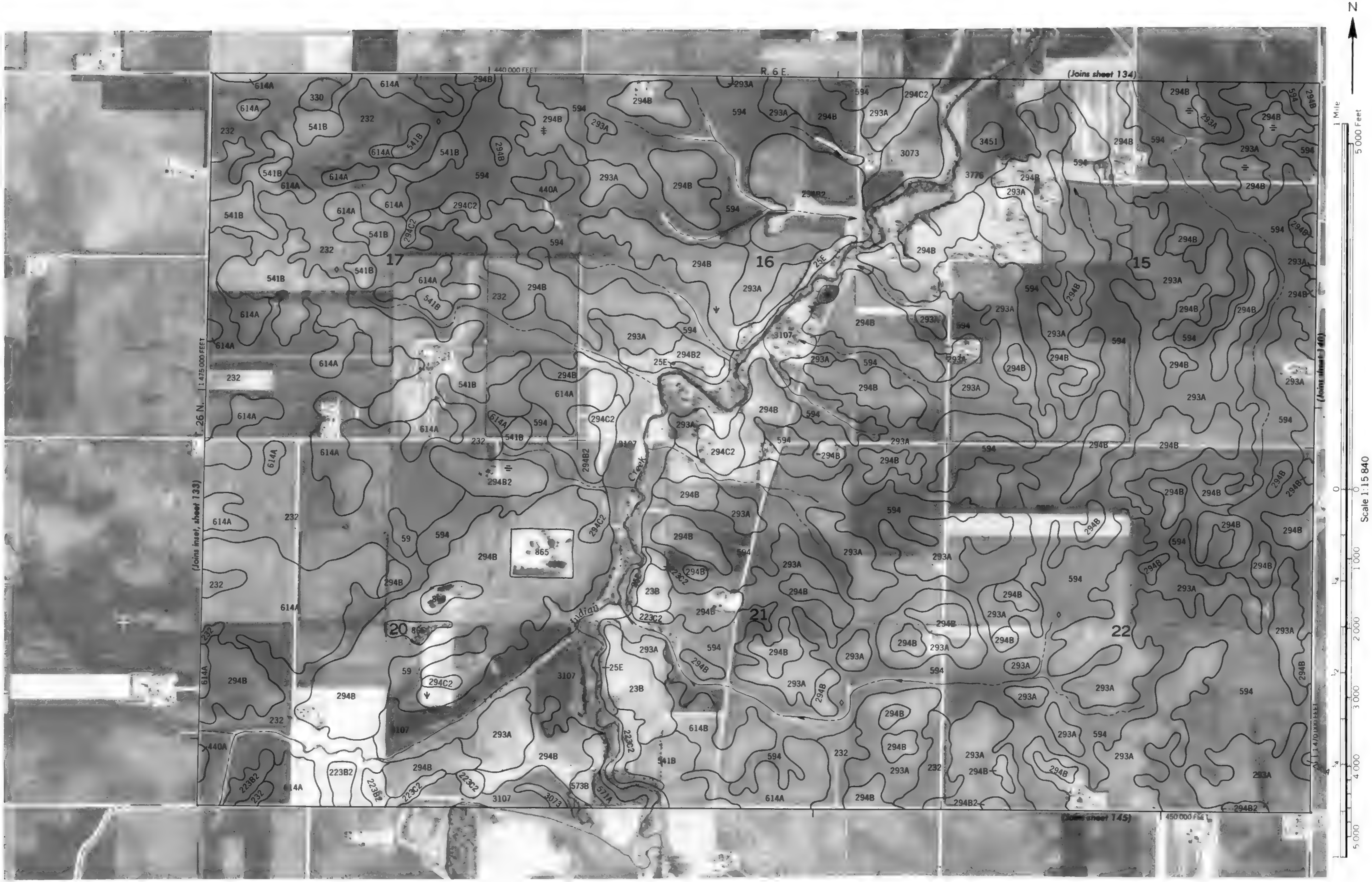


138



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

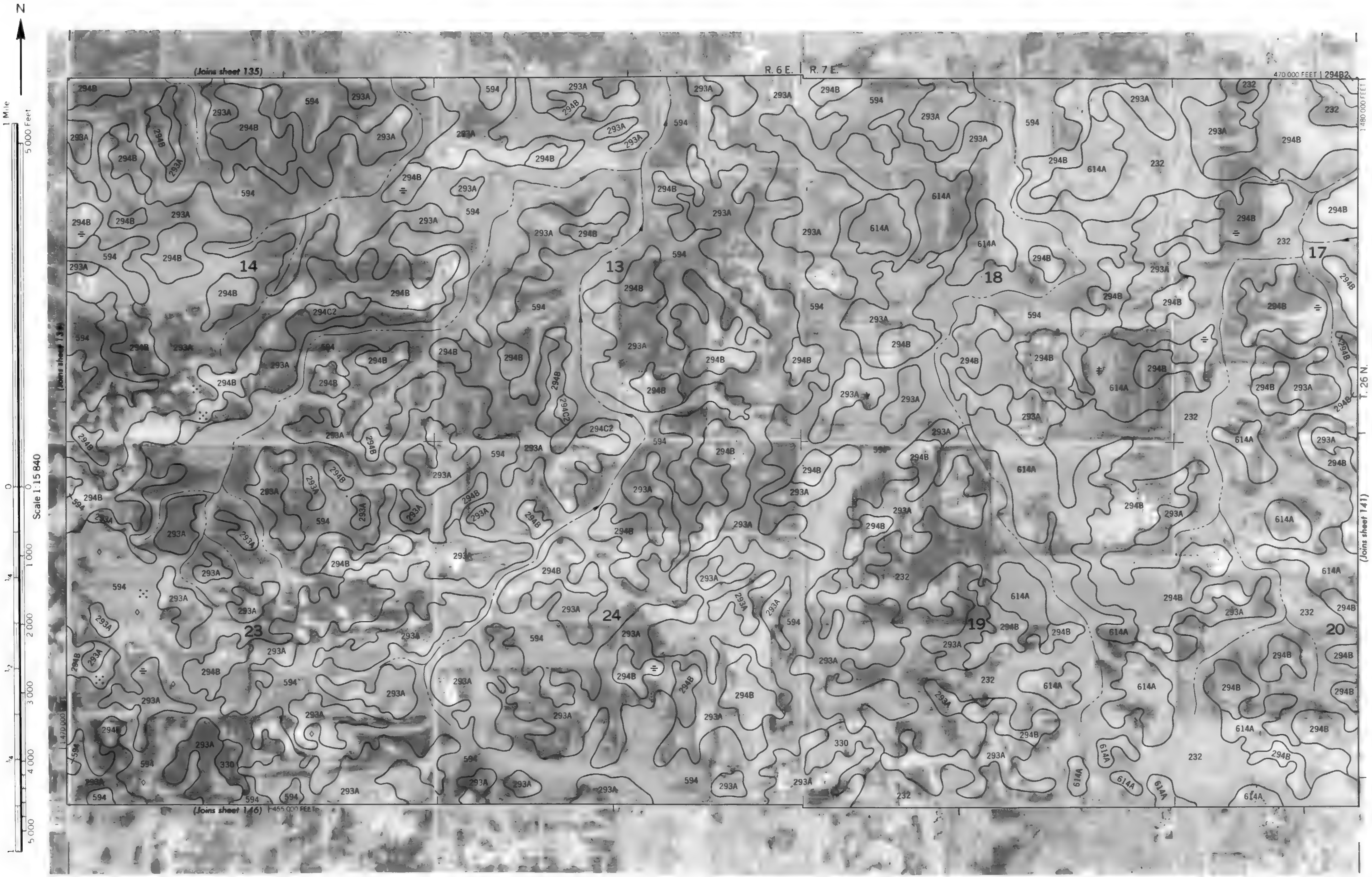
LIVINGSTON COUNTY, ILLINOIS NO. 138



LIVINGSTON COUNTY, ILLINOIS NO. 139

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

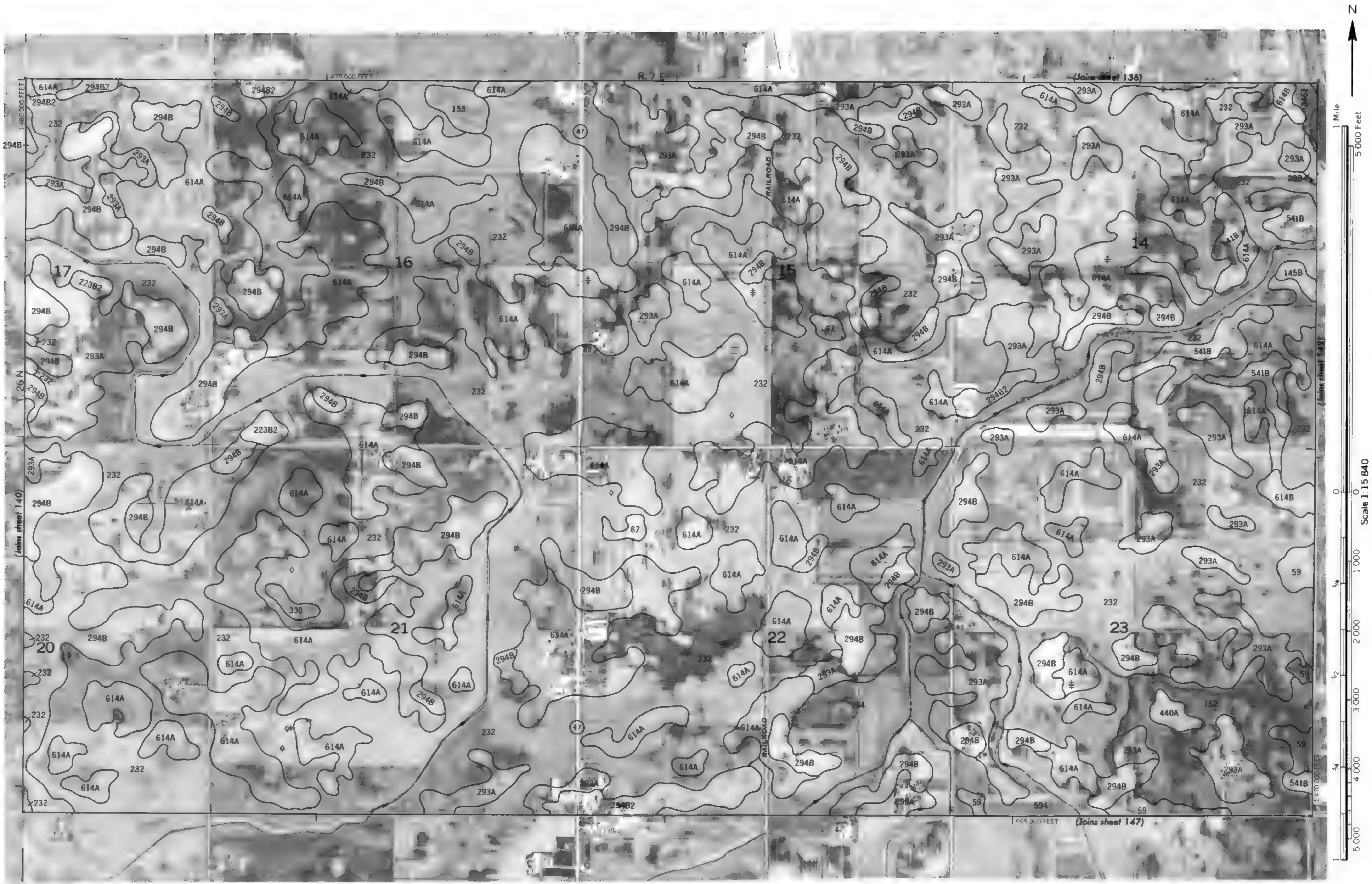
140



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

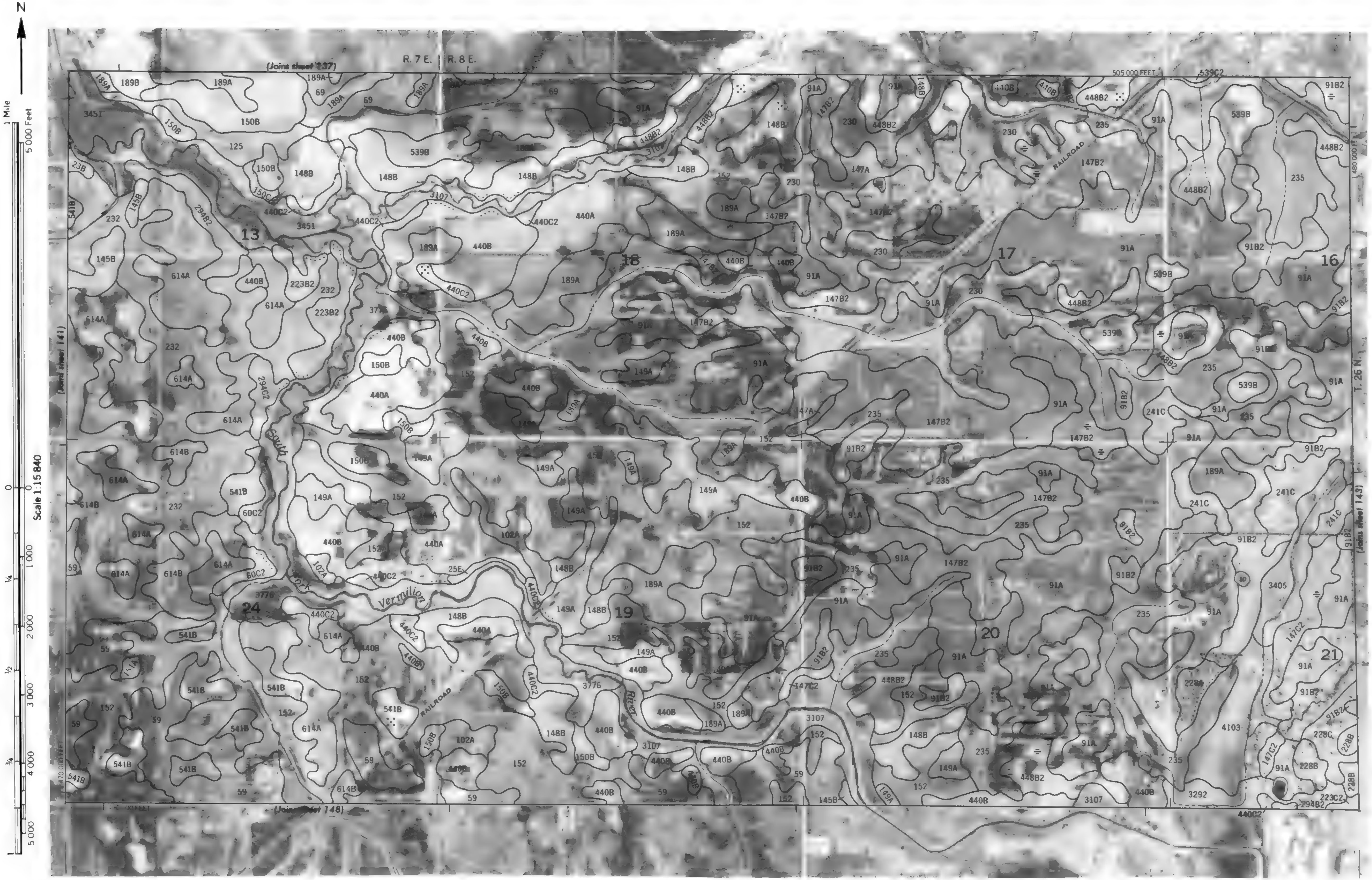
LIVINGSTON COUNTY, ILLINOIS NO. 140

141



LIVINGSTON COUNTY, ILLINOIS NO. 141

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

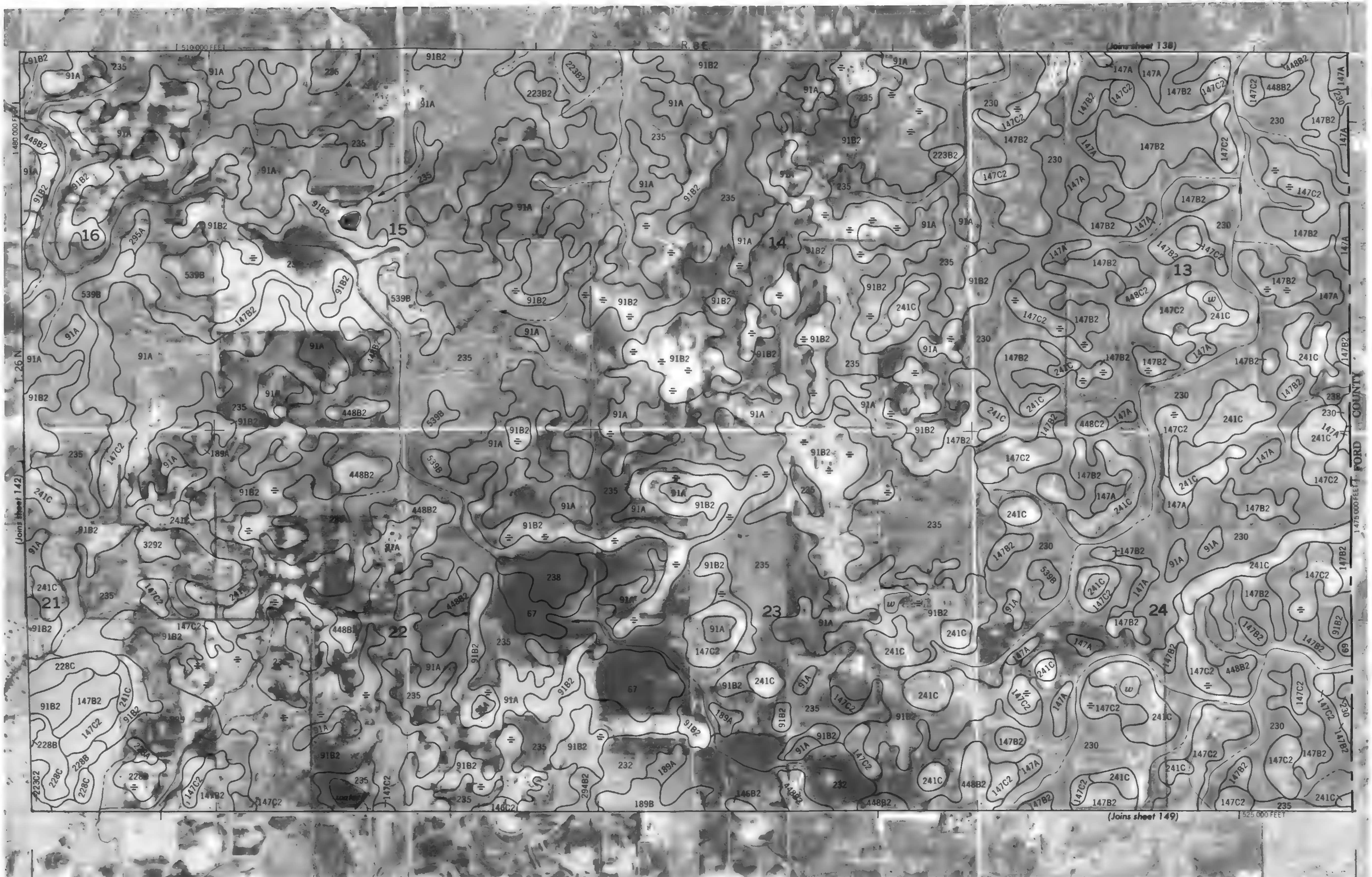


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 142

LIVINGSTON COUNTY, ILLINOIS NO. 143

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

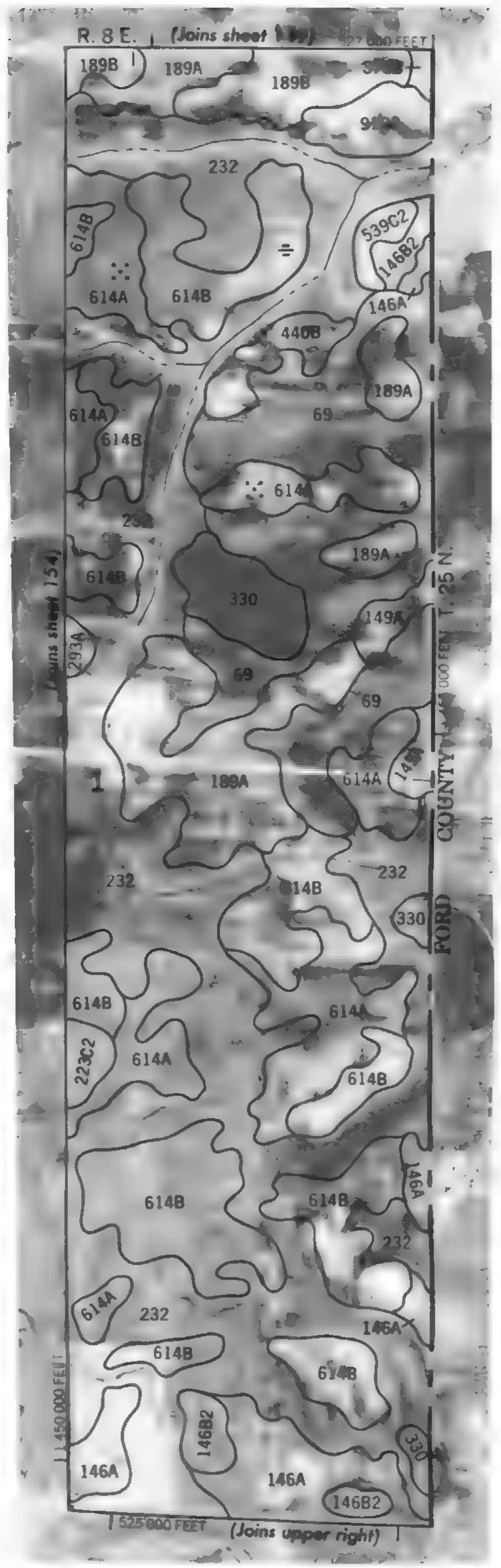
1 Mile

5 000 Feet

Scale 1:15 840

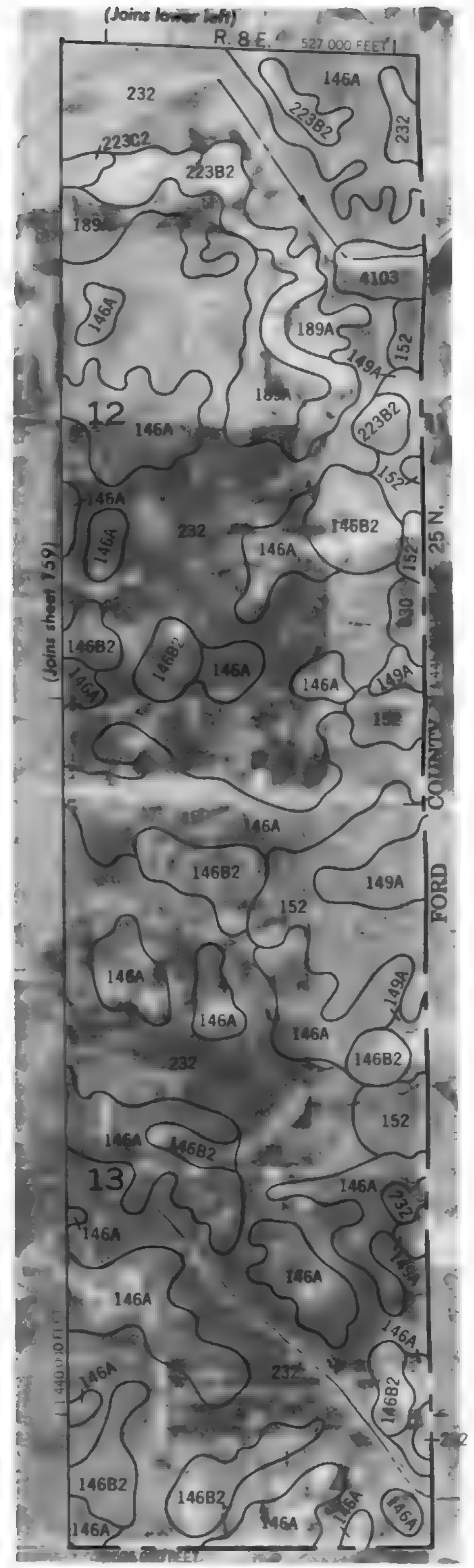
SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 144

INSET A

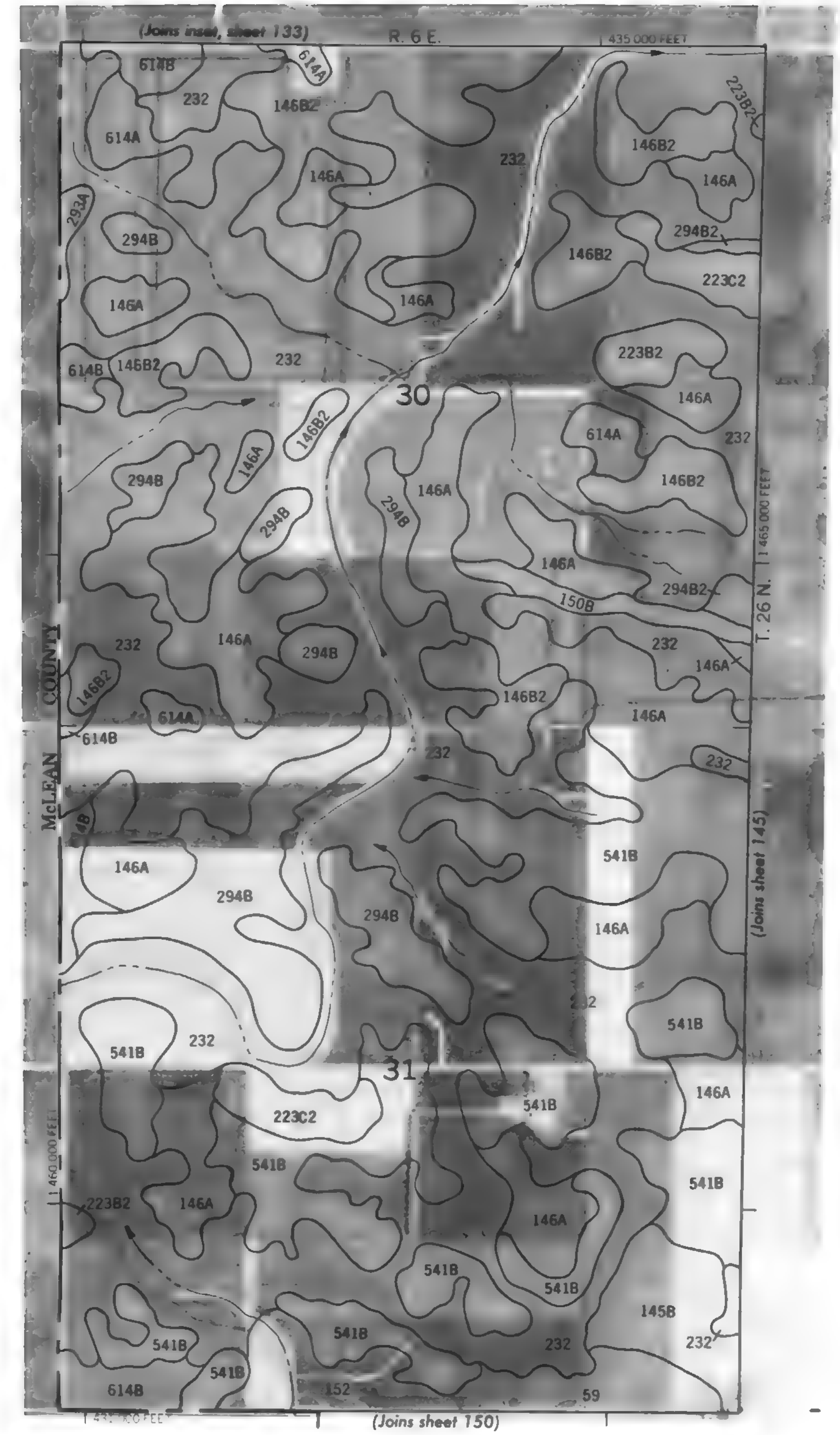


2000 AND 5000-FOOT GRID TICKS

INSET B



2000 AND 5000-FOOT GRID TICKS

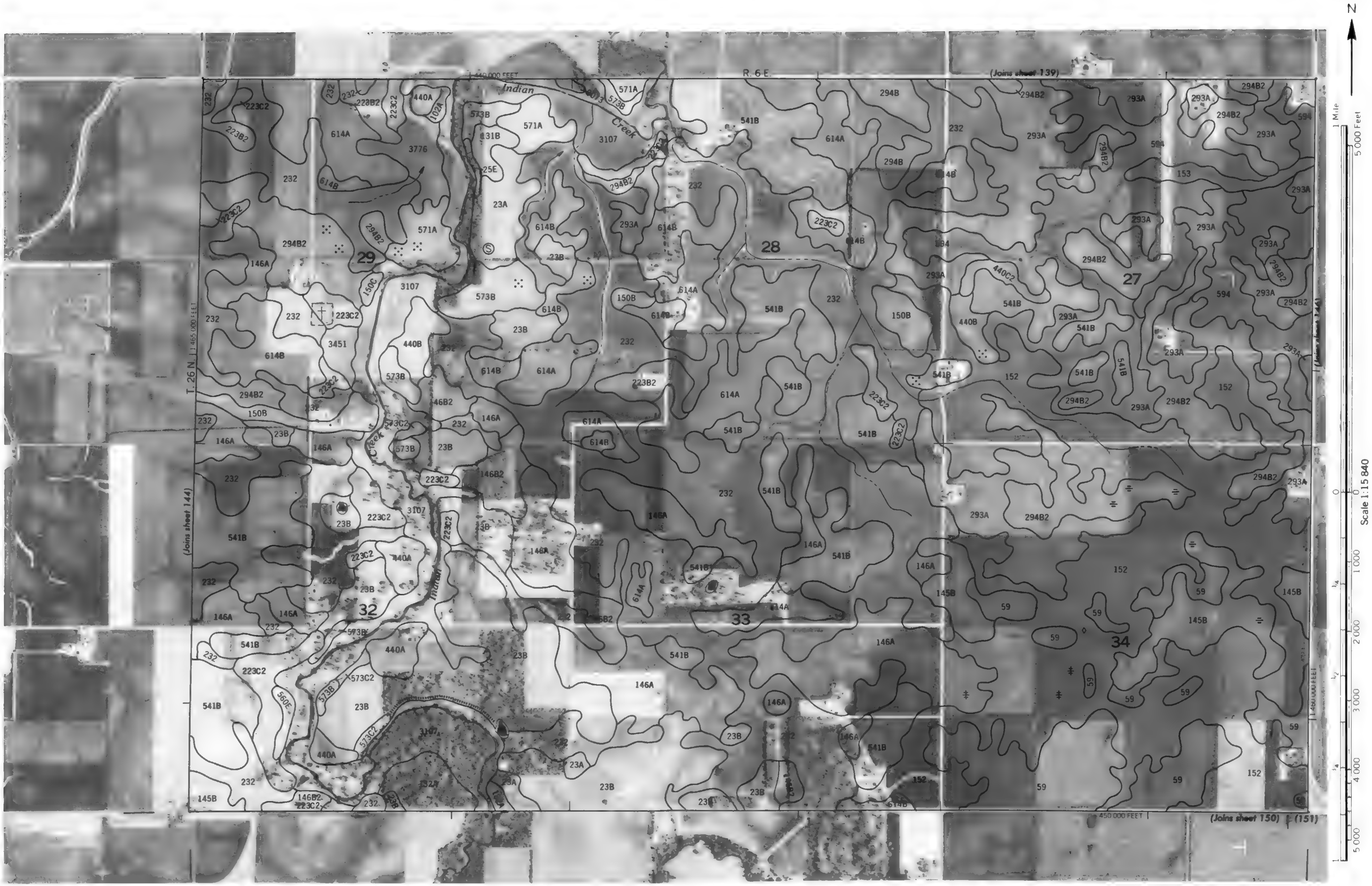


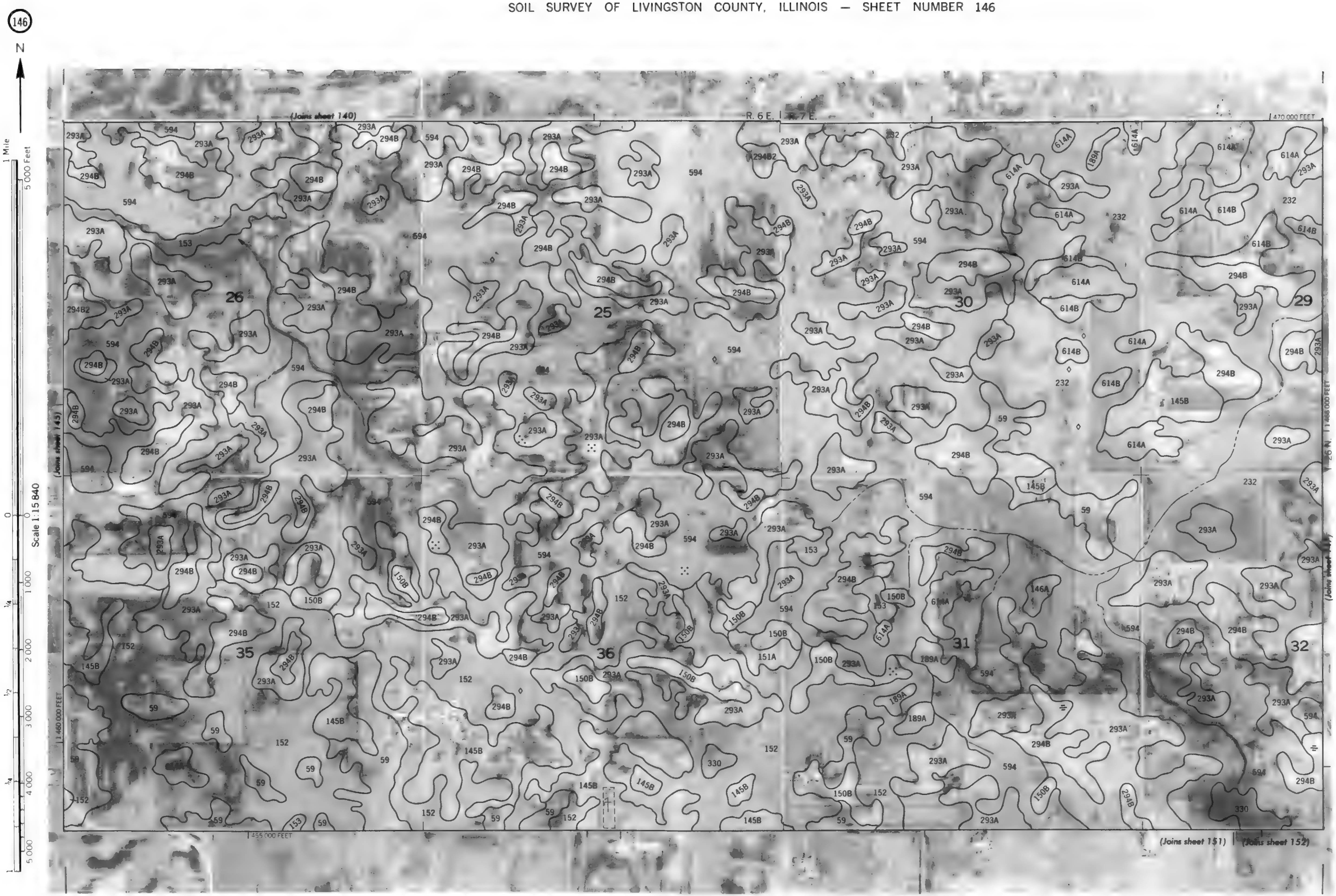
4000 AND 5000-FOOT GRID TICKS

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 145

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





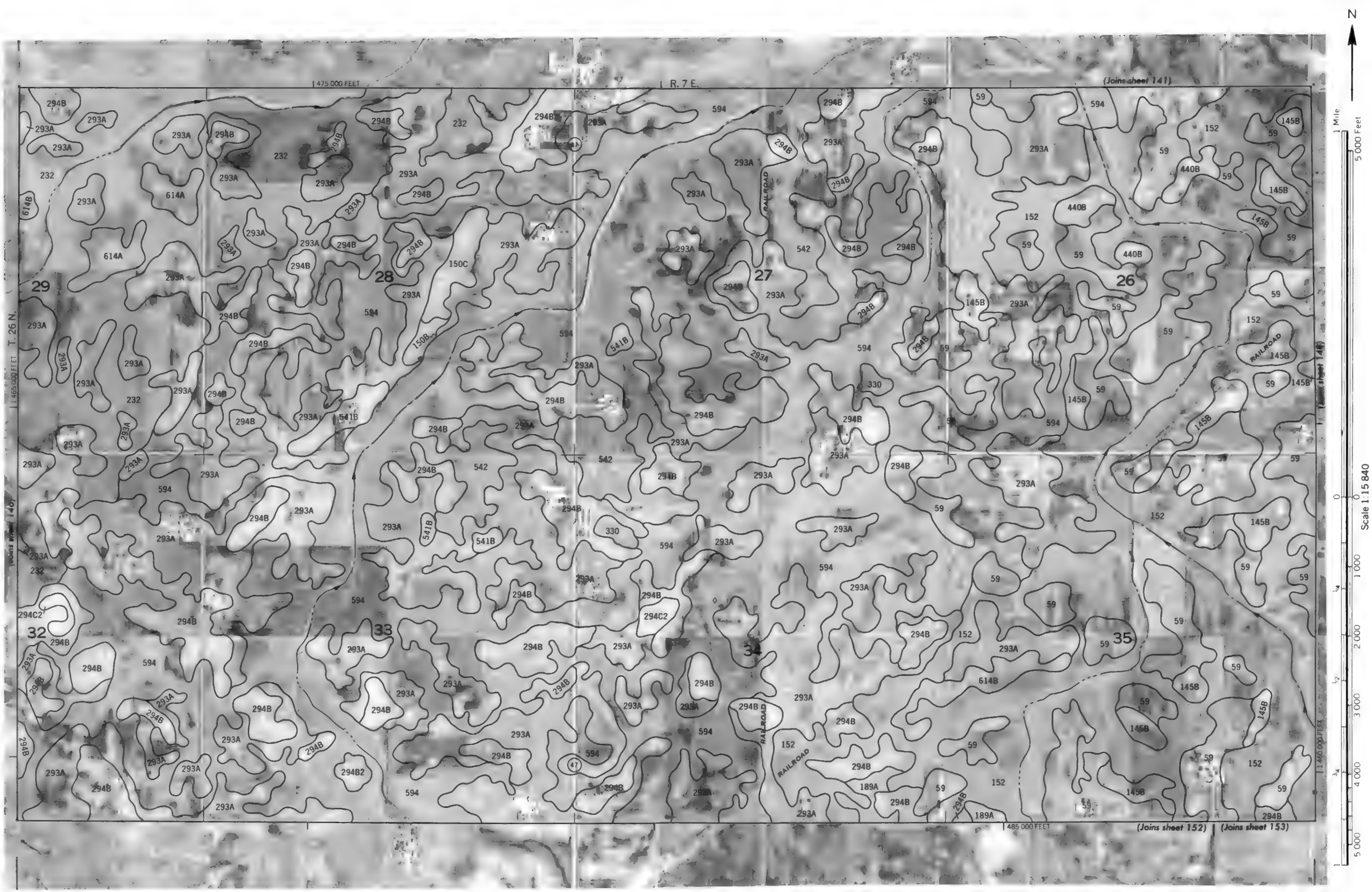
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 146

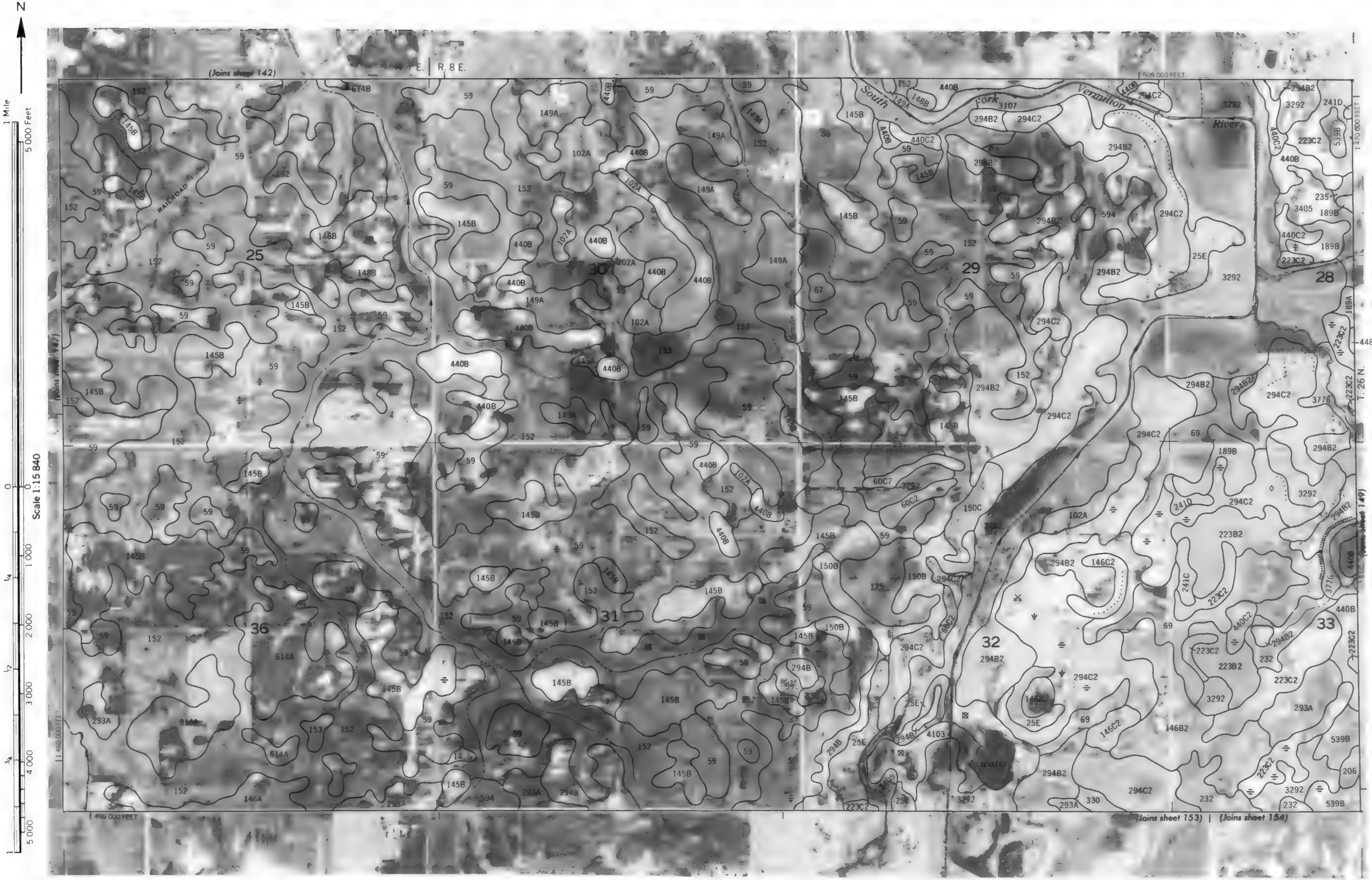
(147)

LIVINGSTON COUNTY, ILLINOIS NO. 147

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



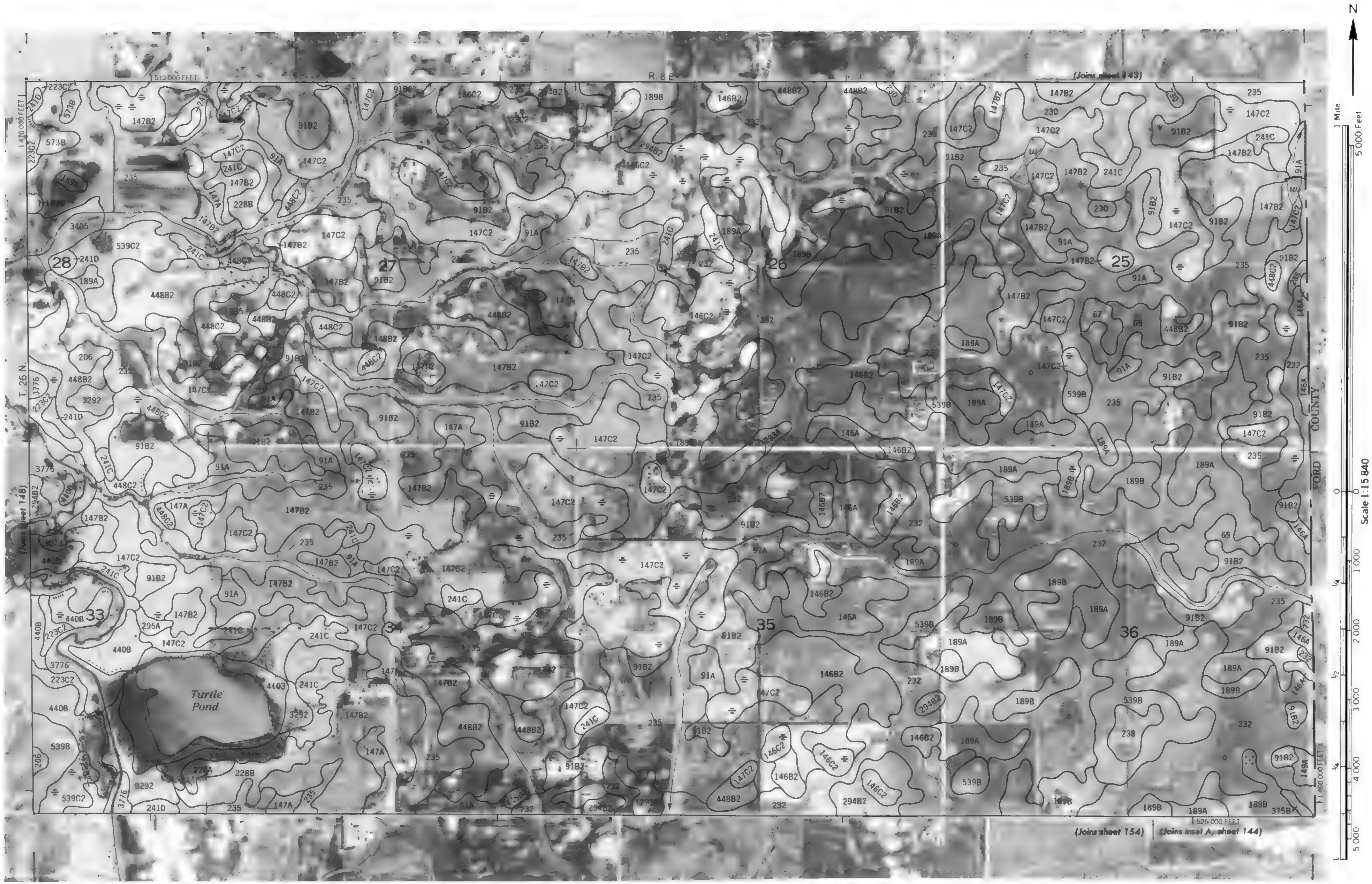
148



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 148

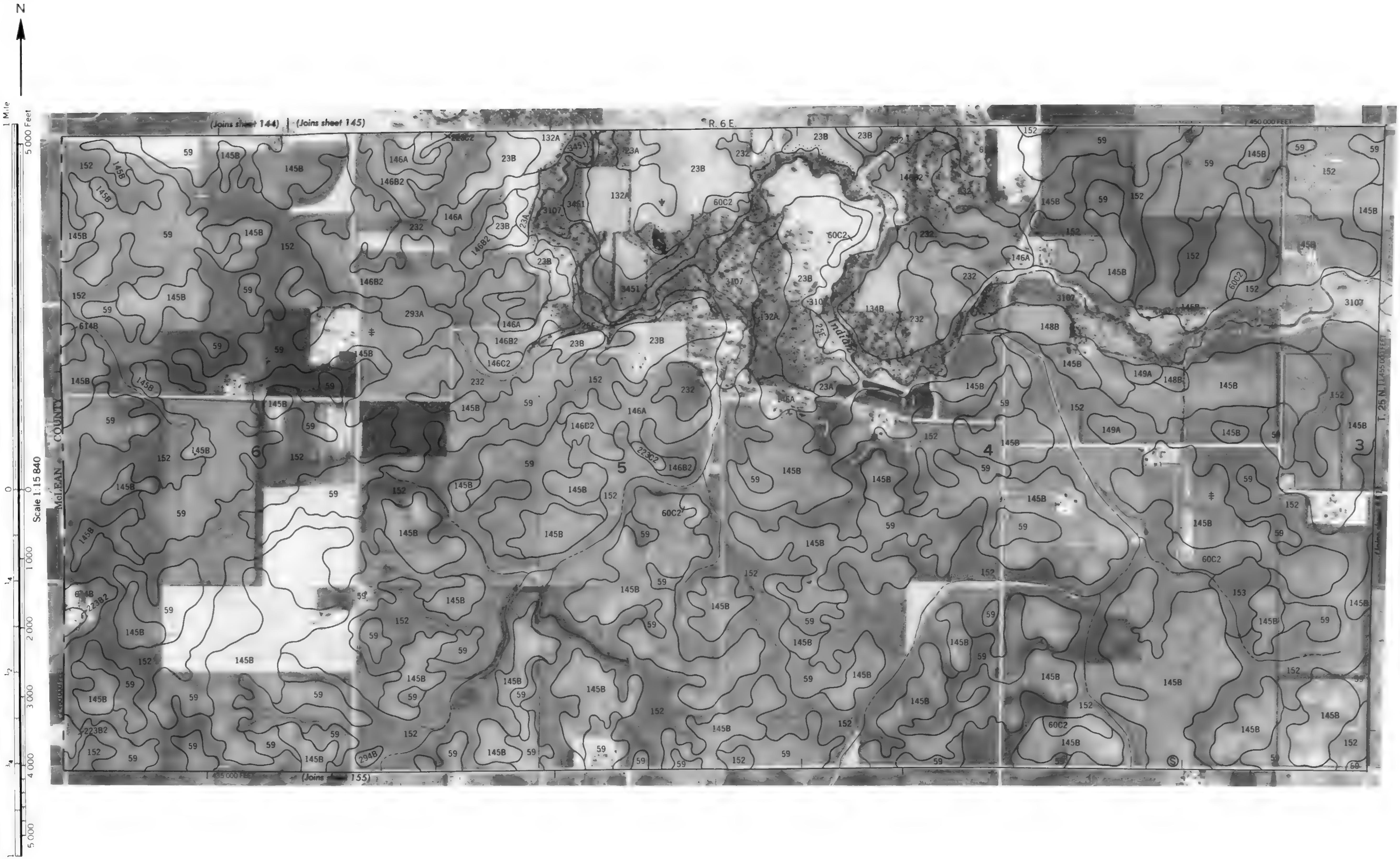
149



LIVINGSTON COUNTY, ILLINOIS NO. 149

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 · 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

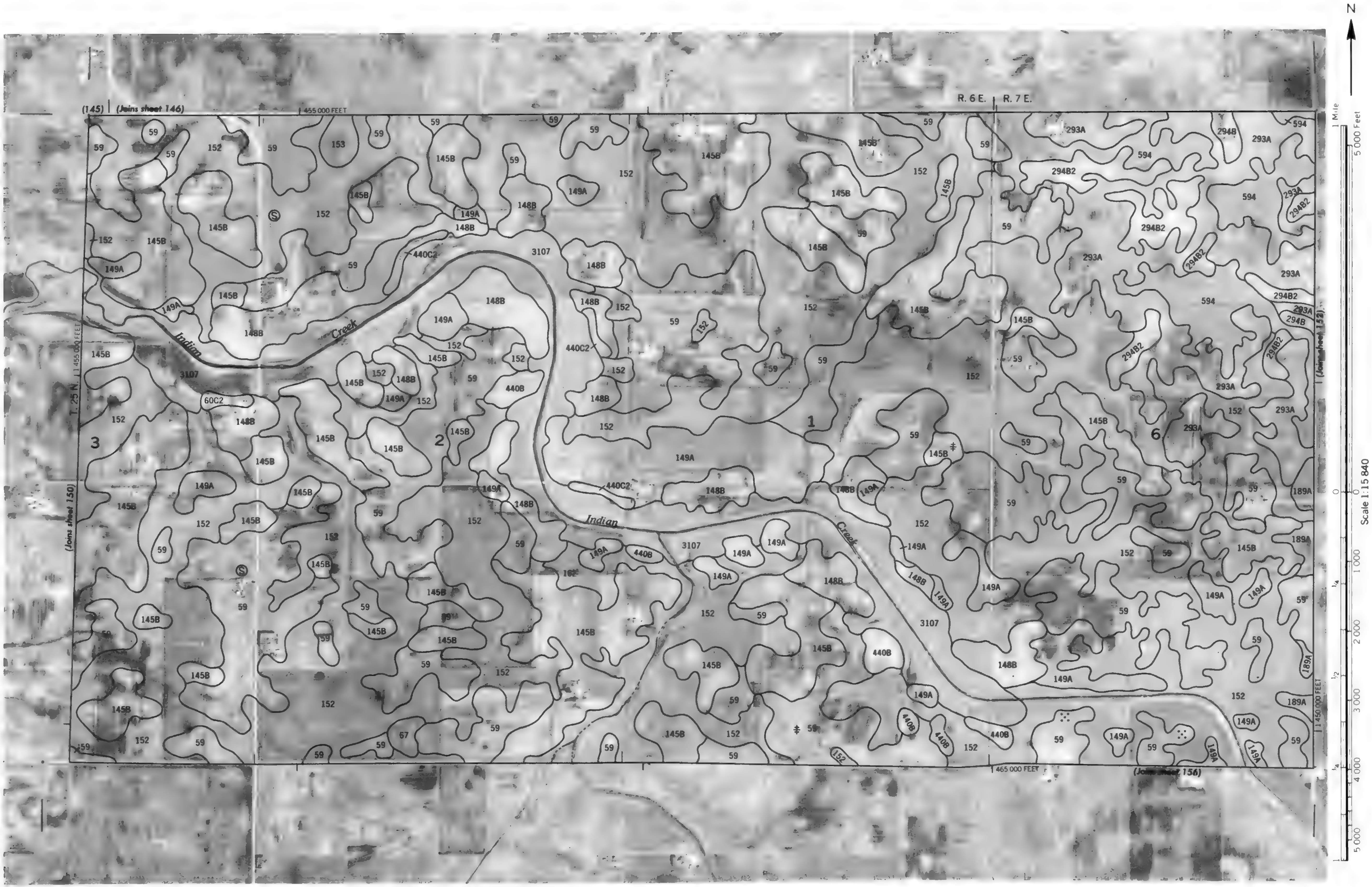
SOIL SURVEY OF LIVINGSTON COUNTY, ILLINOIS — SHEET NUMBER 150



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 151

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



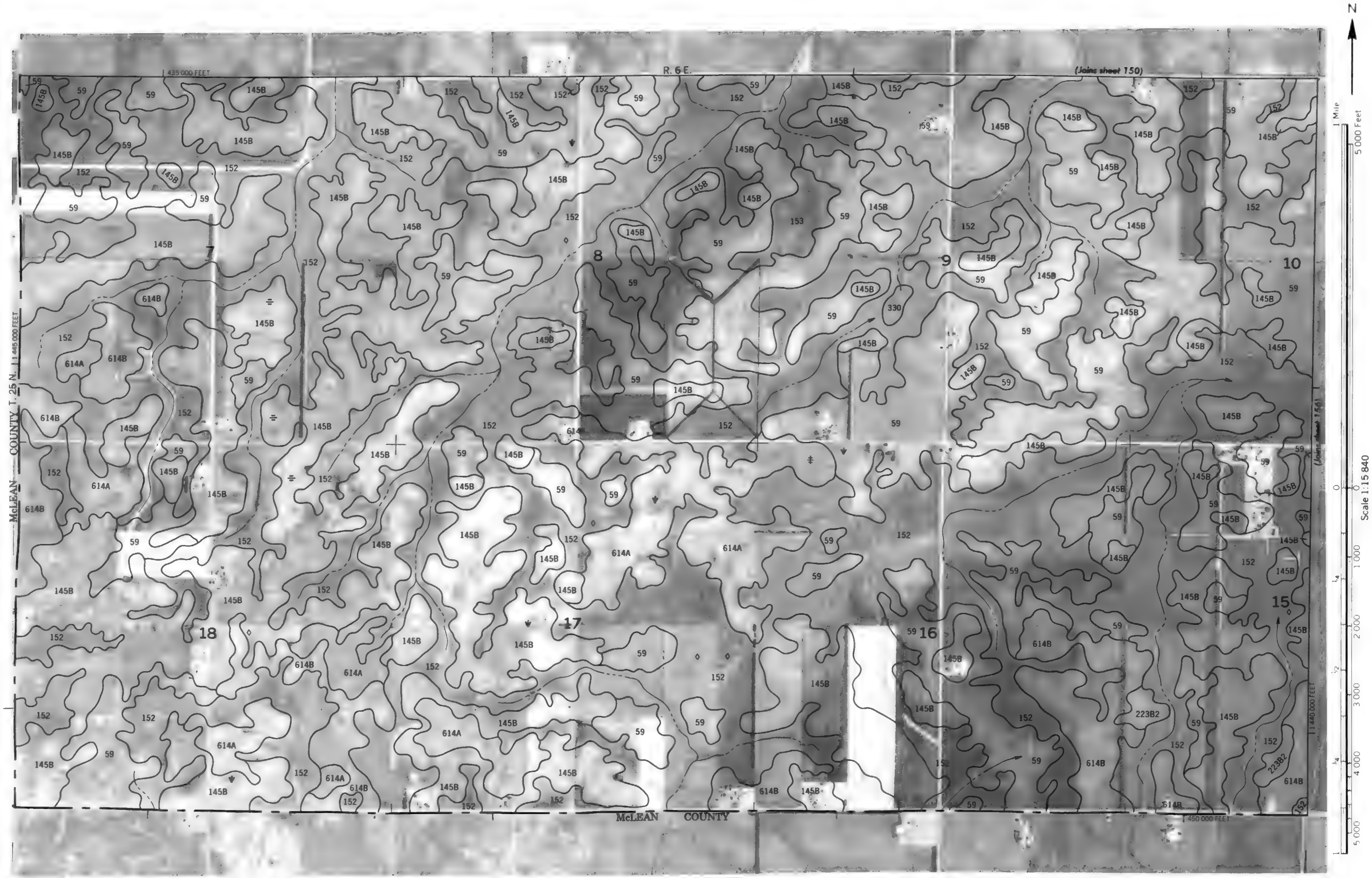
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

154

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

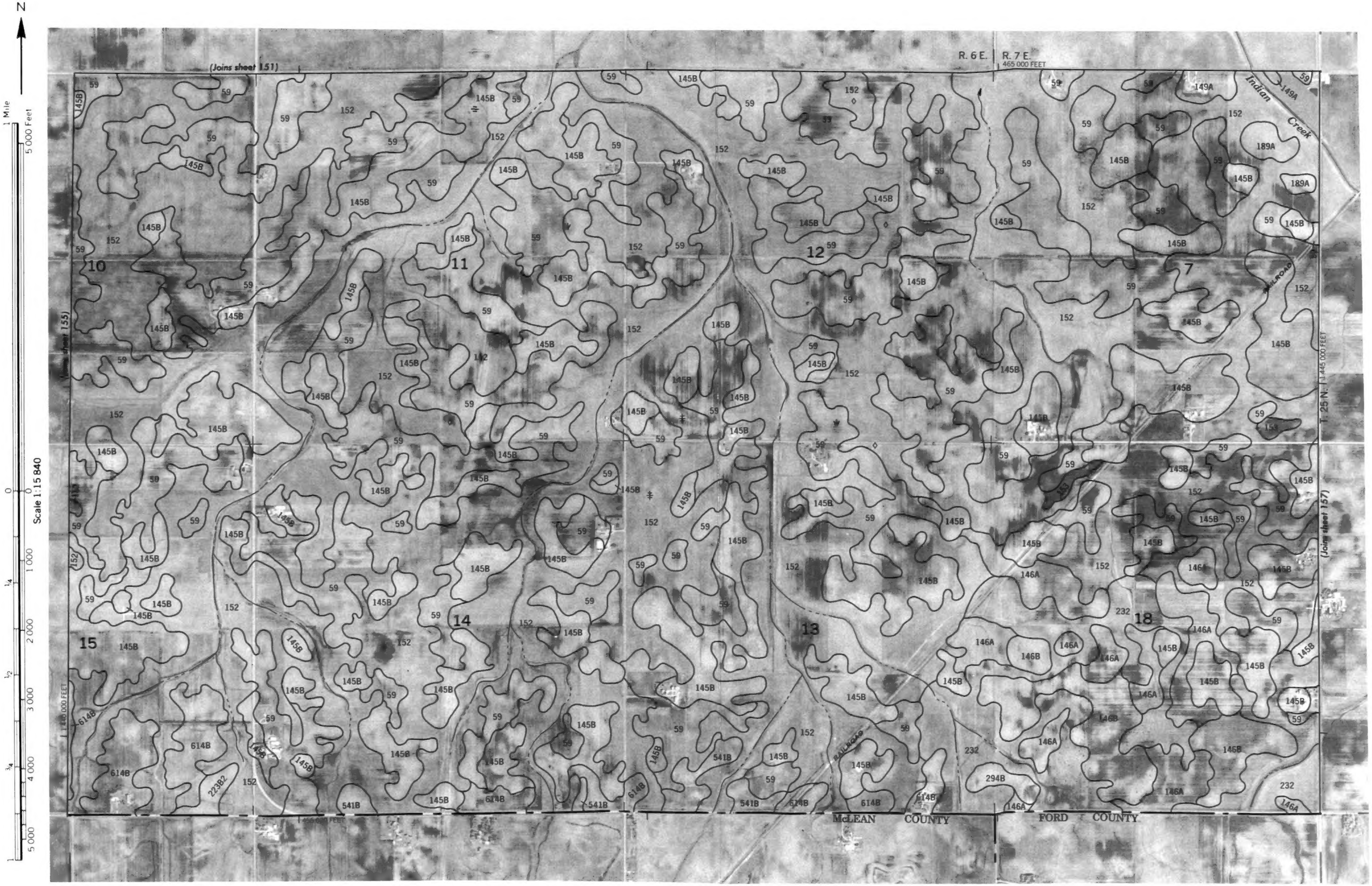
LIVINGSTON COUNTY, ILLINOIS NO. 154



LIVINGSTON COUNTY, ILLINOIS NO. 155

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

156

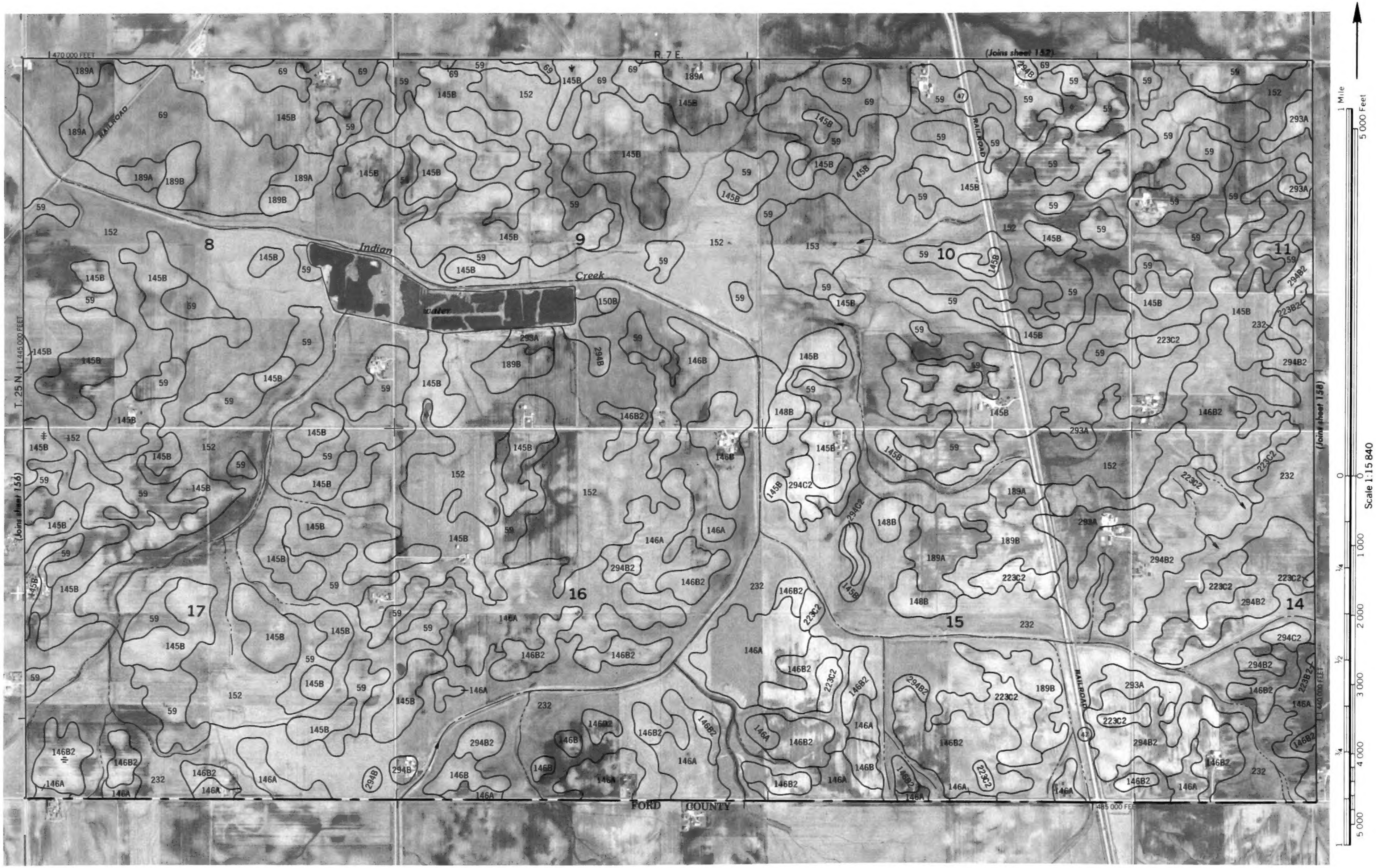


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LIVINGSTON COUNTY, ILLINOIS NO. 157

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

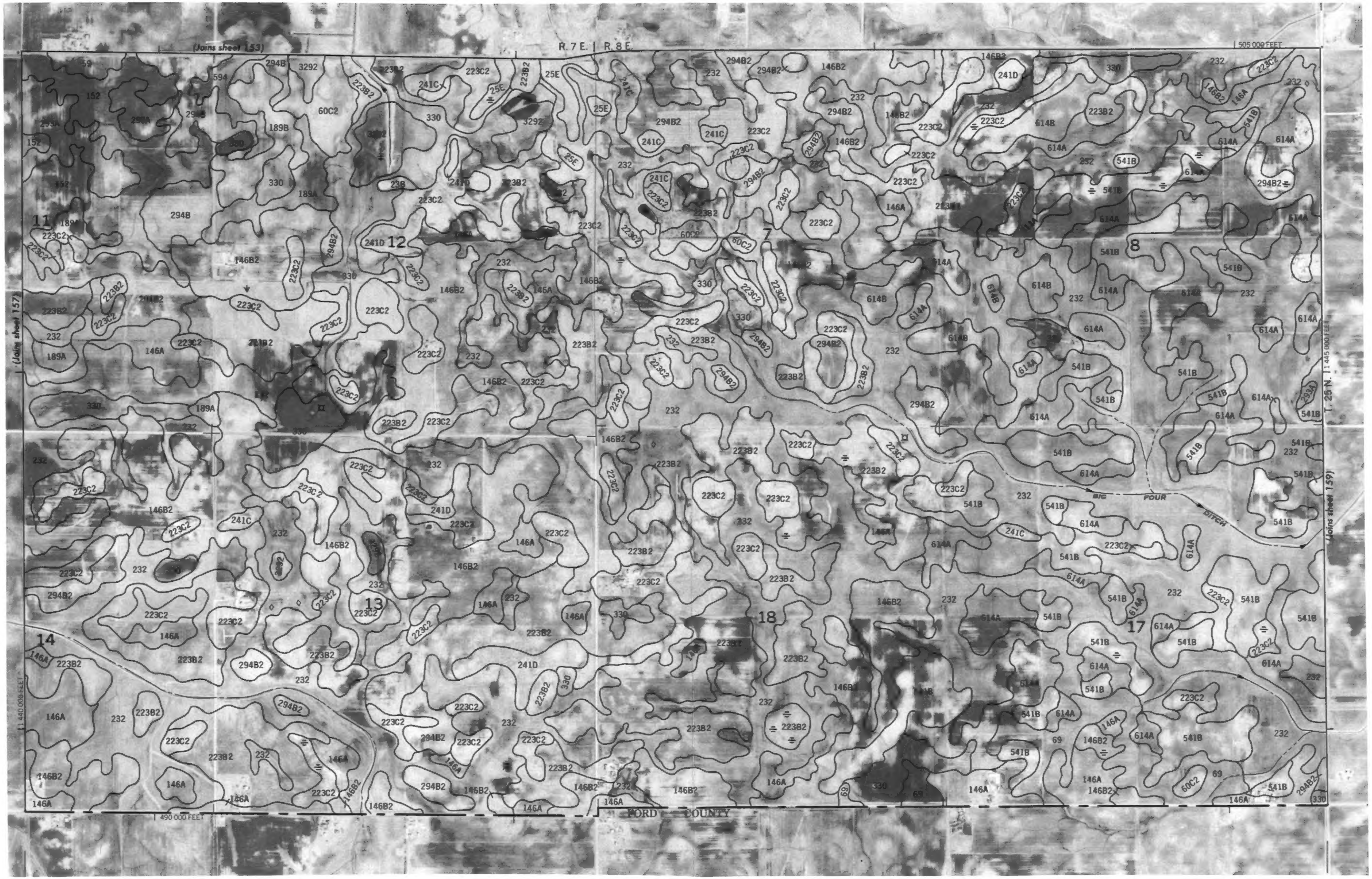
(157)



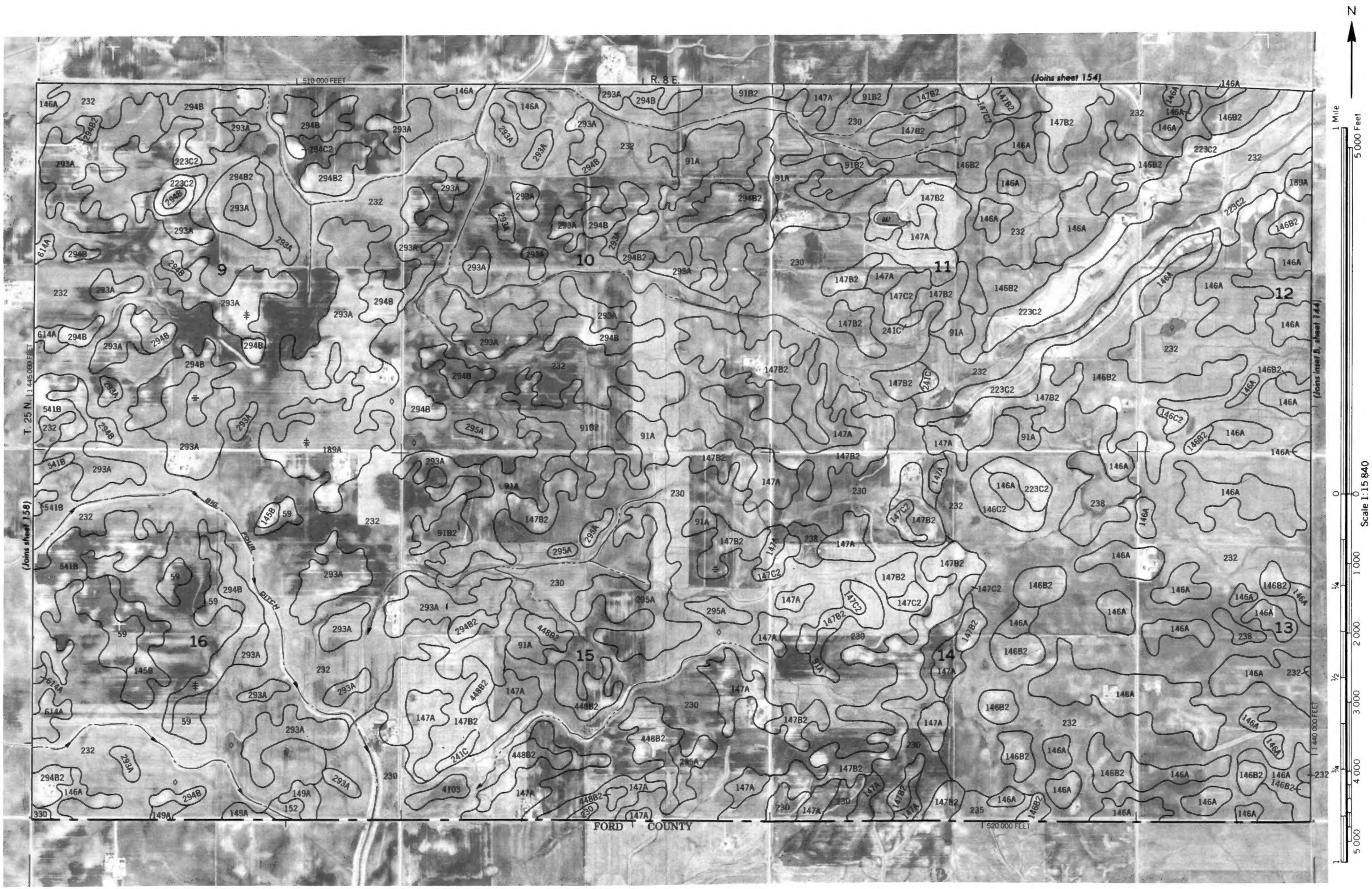
158

N

1 Mile
5 000 Feet
Scale 1:15 840



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983–1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



LIVINGSTON COUNTY, ILLINOIS NO. 159

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 - 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.